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The Archibald Watson Memorial Lecture.[1]

By SIR HENRY SIMPSON NEWLAND,
Adelaide.

THAT the honour of being the first Archibald Watson lecturer should be mine is something that I never for one moment contemplated. I acknowledge the trust that the President and Council of each of the Royal Australasian Colleges have reposed in me, and I shall attempt to justify it. At the same time I desire to thank Professor A. A. Abbie, the present occupant of the Elder Chair of Anatomy in the University of Adelaide, for his chivalrous approval of the collegiate invitation to me. I had expected that he would occupy the proud position I do.

Events culminating in the genesis of the Archibald Watson Memorial lecture had their origin over half a century ago and are not without their interest. In the "naughty nineties" the honorary medical staff of the Adelaide Hospital became involved in a dispute with the Government of the day and resigned. Bereft of their clinical teachers, the medical students were compelled to migrate to the medical schools of the University of Melbourne and the University of Sydney. The migration was to bring honour to the University of Adelaide, for Charles Blackburn took first place in the final year of the medical course in Sydney and Julian Smith attained the same high distinction in Melbourne. These men had studied under Professor Archibald Watson and other able teachers.

Later on, in addition to his surgical attainments, Julian Smith gained a great reputation for portraiture photography, which extended overseas. Happening at his request to be one of his sitters in 1934, when I was President of the Royal Australasian College of Surgeons, I saw at his house the fine portrait of Professor Watson by McInnes. The artist's achievement was largely the result of Julian Smith's skilful shepherding of a non-complacent subject. I was so impressed by the portrait that I at once determined to secure, if possible, a replica for the University of Adelaide. As the celebration in 1935 of the jubilee of the foundation of the medical school of the University of Adelaide was not far off, and as the completion of the portrait by the artist in time was doubtful, Julian Smith very generously allowed me to have the original and he himself took the copy. Professor Watson's old students and some interstate friends responded so generously to my appeal for subscriptions that not only was the cost of the portrait met, but enough remained to endow the Watson Prize in Anatomy at the University of Adelaide. In the course of the jubilee celebration the portrait was presented to the university.

But what, you may ask, has all this to do with the genesis of the Archibald Watson Memorial Lecture? The connexion is this. Five years later, on July 30, 1940, Professor Watson died and a bequest in his will savoured, I thought, of a posthumous touch of humour:

> I give and bequeath to Sir Henry Newland, of Adelaide, the sum of one thousand pounds, to be distributed by him in such proportions as he may think fit among the contributors (my old pupils) to the presentation Memorial made by them to me.

The bequest after payment of death duties amounted to over £800. I elected to distribute the amount in equal shares. However, it occurred to me that the contributors as a whole would probably be averse to receiving what, in a sense, would amount to a return in whole or in part of their original donation. I felt sure that they would much prefer that their portion of the bequest should be directed to honouring still further the memory of their old teacher. As the value and application of his teaching were more competently appraised by medical graduates in practice throughout the Commonwealth, my surgical col-

[1] Delivered at the ninth annual meeting of the Royal Australasian College of Physicians on May 1, 1947, at Adelaide.

leagues, whom I consulted, agreed with me that a memorial of an Australian-wide character would be very appropriate. Legal assent having been obtained, the beneficiaries were asked whether they desired payment in cash or whether their share of the bequest should be devoted to the foundation of a memorial of federal significance. It is a testimony to the honour in which "Watty" was held that the response in favour of such a memorial was practically unanimous.

The indenture of the trust reads as follows:

> The Archibald Watson Memorial Lectureship with the approval of the Royal Australasian College of Surgeons, and of the Royal Australasian College of Physicians (these incorporated societies being the trustees of the capital fund) has been established on the following terms:
>
> (1) The trustees will arrange for a lecture to be given annually in one of the States of the Australian Commonwealth, namely, South Australia, West Australia, Victoria, New South Wales, Queensland and Tasmania, the first of such lectures to be given in the State of South Australia in the year 1947, and thereafter in rotation in the States herein beforenamed in such order as the trustees may from time to time determine.
>
> (2) The lecturer shall be chosen in alternate years by the President for the time being of the said the Royal Australasian College of Surgeons (who shall nominate the first lecturer), and the President for the time being of the Royal Australasian College of Physicians, and the subject and title of the lecture shall, in each case, be approved or selected by the President nominating the lecturer.
>
> (3) The lectures shall be open to all duly qualified medical practitioners and to medical students and (when approval has been given by the nominating president) to the public. After paying any expenses incidental to the administration of the trust, the remaining income is to be applied by way of an honorarium to the lecturer for the year.

The genesis and foundation of his memorial lectureship having been traced, it is appropriate that I should now address myself to the man himself. He came of fighting stock and he volunteered to serve in every war he could. His grandfather was Lieutenant-General Archibald Watson, of the First Regiment of the Bengal Cavalry. His father, Sidney Grandison Watson, who had retired from the Royal Navy with the rank of commander, was for a time with Sir George Grey in Western Australia. A disagreement terminated their association. Sidney Grandison Watson evidently had a good eye for country, for he acquired large holdings on the Upper Murray. The head station, about seventeen miles from Albury, was known as "Walwa". He prospered with his four cattle stations, acquired great wealth, and became known as "King of the Upper Murray". He married twice, and had, according to one who knew, "mobs of children". The Watsons were rather an eccentric family. A son had some fancy religion with seances and faith-healing adventures; like his father's cattle, they paid, for he too made a fortune. Not only was the family a little eccentric, but the sons liked living "rough and tough", and looked it. The Watson city residence, "Yarra Grange", a large and handsome house, was situated in a suburb of Melbourne.

Archibald Watson was born on July 27, 1849, at Tarcutta, not far from Wagga Wagga in the Riverina. He himself stated that he was born "under a dray". However, as at that immature period of his existence the superb power of observation which he was to develop later was dormant, his assertion must be taken with a grain of salt. The earliest incident in his life, and one, curiously enough, that he was to regret in his old age, was related by Watson himself in the following circumstances. His friend Dr. Hedley Marston, who was wont to lunch with him in the Adelaide Botanic Gardens, one day met him with tears in his eyes at the usual rendezvous, repeating: "I *was* a little cad. I *was* a little cad." At luncheon Watson threw light on this cryptic utterance. When he was a boy of six at "Walwa" his uncle Archibald arrived on leave from his regiment in India. On the morning of his arrival he showed his little namesake a pair of pistols and how to load and fire one. He then replaced the pistols in their case, locked it, and put the key on his fob. The sumptuous lunch of welcome over, Uncle Archibald slumbered on the veranda. Archie, bent on mischief, crept up to his chair and detached the key from the fob. Upstairs he ran, unlocked the box, and loaded a pistol with powder and ball. Down went Archie to the back of the house and whistled. Presently a one-legged pet magpie came hopping up and perched on an adjacent tree stump. "And then", said the penitent professor, "I blew that bird to bally-hoo. I *was* a little cad. I *was* a little cad." But the words that he said as he told of the death were not a bit like "bally-hoo".

Archie was educated at Scotch College, Melbourne, when that grand old Scot, Alexander Morrison, was principal. Archie gained in one year the first prizes for chemistry, mathematics, natural history and gymnastics. He also took all the scripture prizes. He was a noted athlete and became an amateur lightweight boxing champion. His mother, who died in pregnancy (an extrauterine gestation) when he was at school, favoured the Church as his destiny. Had he taken holy orders it is unquestionable that his powers of invective would have made him a formidable rival of the cleric who cursed the jackdaw of Rheims. Some time after his mother's death, having left school, Archie quarrelled with his father. The old man, who married again, was quite evidently a tyrant, and he treated his sons very harshly. Our bold Archie was a wild boy and neither the field of the Church nor the pastoral expanses of the Riverina being his destiny, he sailed for the Pacific islands and acquired property there.

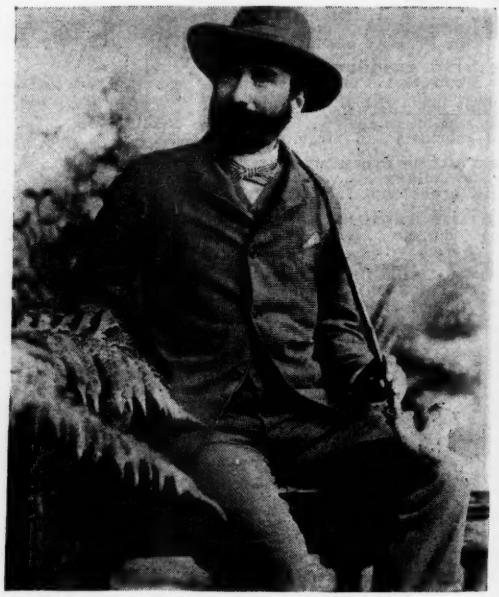

FIGURE I.
Archibald Watson. Taken in Germany.

Unkind fate decreed that he should meet Dr. James Patrick Murray, the owner of the brig *Carl*, who had nefarious intentions. The doctor was a brilliant graduate of Trinity College, Dublin. Watson considered him one of the most intellectual men he had ever met, and it was Murray who inspired Watson to qualify for his ultimate destiny, the profession of medicine. Murray, with all his intellectual attainments, was to acquire the evil reputation of being the blackest-hearted villain in the history of the Pacific islands. Without question their chance acquaintance cast a shadow over Watson's life. I touch on this fact only because, unless it is borne in mind, it is impossible to appraise rightly certain traits in his personality, character and career.

In 1872, at the age of twenty-three, Watson left the Pacific islands and landed in the Yarra off the American schooner *Janet*. After farewells to those at "Yarra Grange" he sailed for San Francisco in the American schooner *Helen*. He travelled across America and thence to England, where he stayed with an aunt (Agatha), his father's sister, the widow of Lieutenant-General Mackenzie. She was a "great" lady, and friend of the Empress Eugenie. Watson became friendly with the son of the Empress, the Prince Imperial, a lad of seventeen, from whom he learned his first French. His aunt arranged for him to study medicine in Germany at Bonn. He arrived there in March, 1874, but left in October to continue his medical studies at Göttingen. Baron von Mueller, botanist to the Victorian Government and a friend of Watson's father, had written on his behalf to Griesbach, the professor of botany, who befriended him. For an Australian to begin

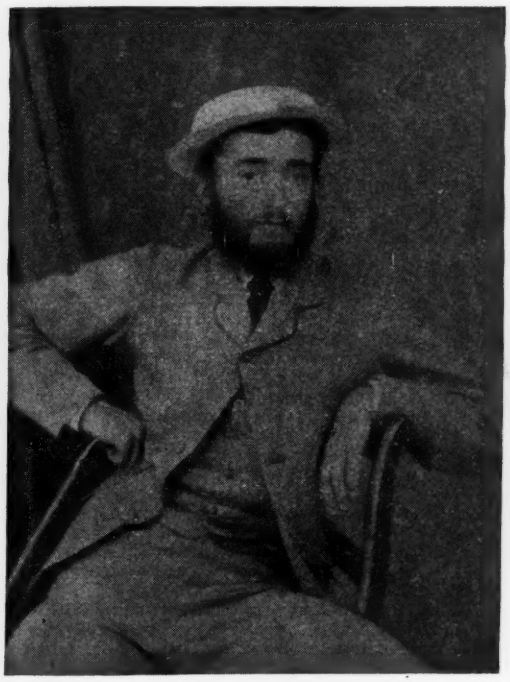

FIGURE II.

Archibald Watson. Taken when he landed in the Yarra from the American schooner *Janet* some time during the Franco-Prussian War, 1872.

his medical course on the Continent was a most unusual thing. It was only for post-graduate instruction or experience that a visit to the Continent was then (and still is) made. At Göttingen he studied under the great anatomist, the venerable Henle, who later supported his candidature for the Elder Chair of Anatomy in the University of Adelaide. He also studied under Meissner, Krause, Köhler, von Brunn, Weber and Sappey, all men of distinction, whose reputations have survived them. In due course he took the degree of doctor of medicine at Göttingen on August 10, 1878. It is worthy of note that his inaugural dissertation for his doctorate was on hysterectomy. Watson exploited kangaroo tendon as ligature material. He then went to Paris and there too he took the degree of doctor of medicine. He was wise in his choice of teachers—Charcot, Broca, Faraboeuf, all giants in those days, who have maintained their stature to the present time. His fellow student, the famous Pierre Marie, was the first to describe the condition of acromegaly, a physical gigantism due to disease of the pituitary gland. To Broca, Watson dedicated his thesis for the doctorate of medicine. He also gained valuable surgical experience as private assistant to Terrier, the leading French ovariotomist. Never a great writer, Watson nevertheless published a few papers in the French and German journals before crossing to England.

As Watson was steeped in the knowledge gained from the masters I have mentioned, and had the French and German languages at his command, it is questionable whether a man of his quality had ever before walked the London hospitals as a prelude to gaining the Fellowship of the Royal College of Surgeons of England. He sought experience at the London Hospital, Charing Cross Hospital, King's College Hospital and Moorfields Eye Hospital. He attended the wards of Jonathan Hutchinson, senior, the great Quaker surgeon, commonly known at the London Hospital as "Old John" to distinguish him from his son "Young John", who had been Watson's fellow student in Paris, and whose house surgeon, years later, I became. "Old John", who had once been ignominiously turned out of York Minster for keeping his hat on, was a man of omnivorous interests, and I have little doubt that he spurred Watson on to adopt a similar course and to make a note of everything.

It was Watson's friendship with the Hutchinsons, old and young, which led him to give letters of introduction

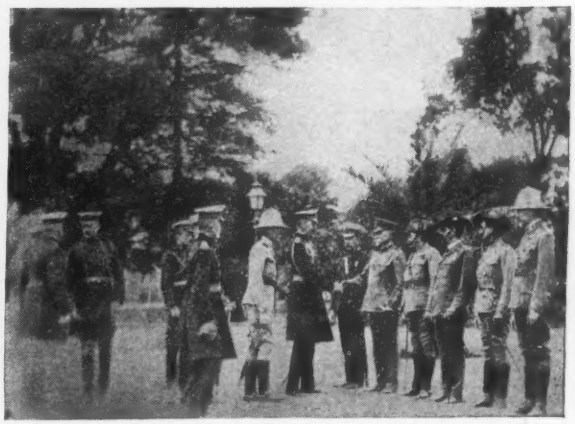

FIGURE III.

Taken during the South African War. Archibald Watson is shaking hands with Lord Kitchener.

to many young South Australian graduates, and which enabled them to live, as Sir Arthur Cudmore and I did, in "Young John's" fine house, once Sir John Gilbey's, 1, Park Crescent, overlooking Regent's Park, for a mere £80 a year, wine and "Old John's" museum thrown in. But the "naughty nineties" were halycon days. Besides taking his fellowship (1884), Watson also became a licentiate of the Society of Apothecaries (1884) and was appointed demonstrator of anatomy in the Charing Cross Hospital medical school, where he became known as "Good Business Watson" from his habit of commending a student in those words when he answered a question correctly. Watson's love of anatomy he credited to the late Sir James Cantlie, surgeon to the Charing Cross Hospital, whose office as lecturer in anatomy he temporarily filled when Cantlie's experience in tropical diseases took him to Hong-Kong. Watson also taught anatomy at Cooke's School of Anatomy, a private school. Employed at the school as a dissecting room janitor was a rascally Frenchman, Pierre Marceau, commonly known as "John", whom Watson later induced to leave "Cooke's" and accompany him to Adelaide to hold a similar position. "John" Marceau was a janitor by day and a waiter in a French restaurant in Soho by night. Watson, who had a great sense of humour and of buffoonery too, told this story of him. Marceau in his spare time used to dig for bones and catch cats in the old cemetery near Gower Street, hard by Cooke's School of Anatomy. He

skinned the cats, cut off their heads and feet, and sold the carcasses to the chef of the restaurant where he worked. In what guise the feline flesh was served I know not. In course of time Marceau quarrelled with his employer and lost his profitable business in cats. This annoyed him very much. In order to have his revenge, he waited one day until lunch time, when the counter and tables in the restaurant were crowded. Throwing on the counter a cat, dead but large as life, he roared: "There, this makes the dozen." *Exeunt* the customers and mine host's profits.

In addition to demonstrating anatomy in London, Watson acted as corresponding member of the anatomical, anthropological and clinical societies of Paris.

In 1882 cholera dramatically invaded Egypt and the deaths in Cairo soon mounted to 500 a day. Watson, ever bent on adventure, scientific and otherwise, went to Egypt

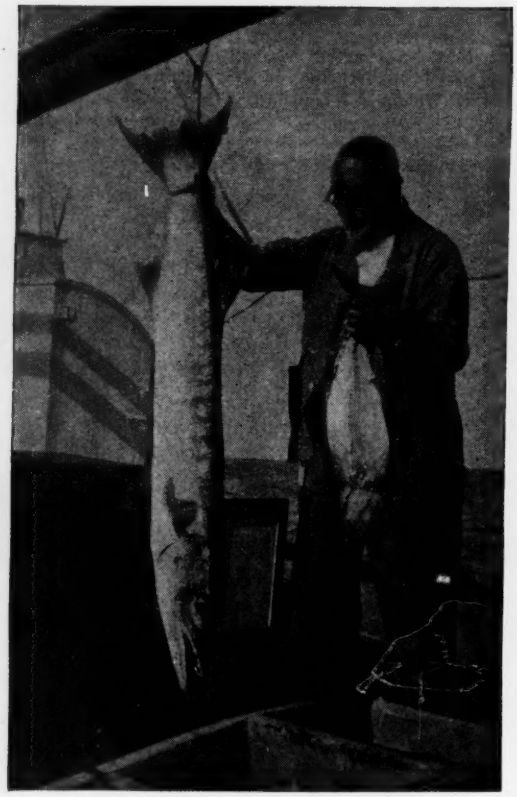

FIGURE IV.

Archibald Watson with his catch of barracuda and bonito off the south coast of New Guinea. Taken on his birthday, July 27, 1935.

with Cantlie. While he was in that land of plagues there was much military activity, for the Mahdi had raised the standard of revolt in the Soudan province. The blood of his fathers stirred within Watson. In company with Honman (who subsequently practised at Williamstown, Victoria) and their mutual friend Leslie, he applied for a post as surgeon in Hicks Pasha's ill-fated Soudan force. For once Watson's linguistic qualifications failed him, Leslie's knowledge of Arabic gaining him the position. Watson was spared, for Leslie died heroically, sword in hand, at the massacre of Hicks Pasha's army. Watson, however, was to serve in the years to come in Africa—as surgical consultant to his sovereign's forces in Natal in the South African War, and in a similar capacity in Egypt during the first World War in 1915.

The cholera epidemic having spent itself, Watson returned to England, where he remained until his appointment to the Elder Chair of Anatomy in the Universtiy of Adelaide.

In the course of the ten years passed by Watson in Germany, France and England, great changes were taking place in surgery, owing to the measures, antiseptic and aseptic, taken to exclude germs from operation wounds. Surgeons were feeling that many operations had become safe which previously had been hazardous. Unquestionably the developments had not passed unnoticed by Watson. Although the abdomen was surgically on the whole a *terra incognita*, the operation of ovariotomy had been performed for many years. This, of course, was due to the fact that an ovarian cyst of any size caused a visible and palpable swelling of the abdomen, and to the fact that the cyst collapsed when punctured and emptied of fluid, and could then be withdrawn from the abdomen through a comparatively small abdominal incision. Prior to 1878, or only seven years before the foundation of the Adelaide medical school, it was the practice to close the abdominal incision around the pedicle or stalk, which still anchored the collapsed cyst to its intraabdominal attachment. The pedicle, fixed in the sutured incision, was next divided outside the abdomen by being crushed, ligated or burnt through with the cautery. Even in the hands of the most experienced surgeons the operation had a mortality rate of 25%. A new star, however, was rising in the surgical firmament. After 1878, Lawson Tait, a Birmingham surgeon, ligated the pedicle *en masse* with boiled silk, divided it, dropped the stump back into the abdominal cavity, and then completely closed the abdominal incision.

At the great International Medical Congress held in London in 1881 Watson was present, and I am told that he and Lord Lister acted as interpreters for the great Pasteur, who knew no English. At that congress Lawson Tait contributed a notable paper on recent advances in abdominal surgery, based on 66 cases of a wide variety of abdominal conditions. Outstanding among the surgical advances resulting from Tait's work was the operation for ruptured ectopic gestation, a condition from which, as I have said, Watson's own mother died. "The tragedy of these cases, slowly and almost inevitably dying of hæmorrhage, had impressed itself deeply on the medical profession." In 1883, while Watson was still in England, Lawson Tait operated in his first successful case, having in a post-mortem examination found how easily the arrest of hæmorrhage might be achieved. Ten years later the first post-mortem examination I attended as a medical student was that on a beautiful young woman, who lay blanched and white as a marble statue, a victim of the unstemmed flow of blood into the abdominal cavity from a ruptured pregnant Fallopian tube. The circumstances made a profound impression on me, an impression which was deepened by the curses and comments of Professor Watson on how the tragedy might have been prevented.

In 1886, a year after Professor Watson's arrival in Adelaide, Lawson Tait, as a result of his bold innovation in the treatment of the pedicle of ovarian cysts, was able to publish a list of 137 consecutive ovariotomies without a death. It is no cause for wonder that Watson's interest in abdominal surgery was intensified by these dramatic advances during the decennium I have mentioned. His profound knowledge of anatomy and pathology and his cognizance of what could be achieved by competent surgery placed him in a unique position to teach others in the new Australian field in which he was to work. Many of his great teachers in Germany and France supported his candidature for the Elder Chair of Anatomy. His selection was made from a large number of applicants by Professor Flower, of the British Museum, by Dr. Edward Stirling and by Professor Humphrey of Cambridge, who presented Watson with a valuable collection of books and his portrait. Watson was thirty-six at the time of his appointment. He came to Adelaide at a time when important changes were pending in the teaching of anatomy in the medical schools of the great London hospitals. Professorial chairs existed at Oxford, Cambridge, Edinburgh, Dublin, Melbourne and Sydney. But in London the lecturers were surgeons on

the active surgical staffs of the hospitals. These in the course of the next ten years or so were to be replaced by professors or lecturers on the science of anatomy. Teaching of the surgical applications of anatomy and pathology was still, however, retained by the surgeons. It fell also to the lot of Watson, for a year after his arrival he was elected pathologist to the Adelaide Hospital and lecturer on operative surgery, surgical anatomy and pathological anatomy, all of which important teaching positions are nowadays as a rule filled by different specialists. Therefore, it is not an exaggeration to say, as Wood Jones said, that Professor Watson was the last and greatest of the individualists. In his presidential address before the Section of Anatomy, Physiology, Pathology and Pharmacy at the Intercolonial

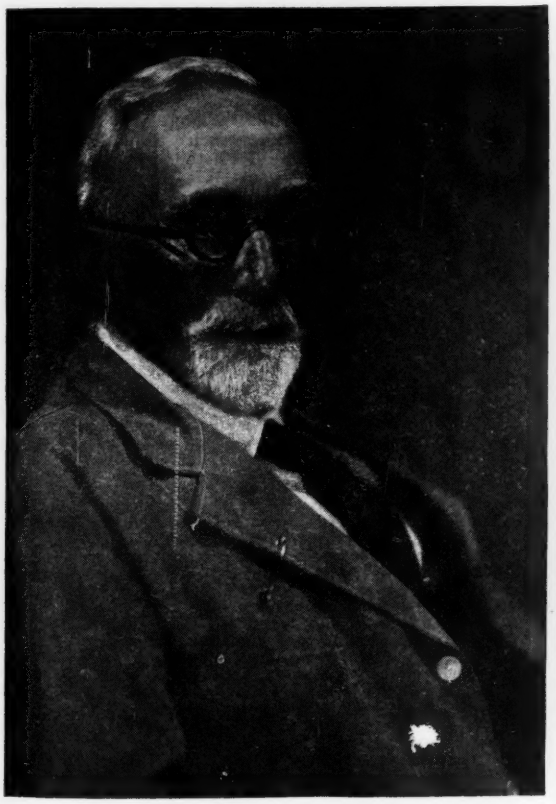

FIGURE V.

Photograph. Archibald Watson taken by Dr. Julian Smith on April 15, 1936.

Medical Congress at Dunedin, New Zealand, in 1896, Watson expressed his views on "The Study of Anatomy and Physiology", as follows:

> The teacher who only deals with anatomy as a pure science often fails to attach due value to those points, which are important in the practice of medicine. . . . It goes without saying that without ample practical experience, scientists cannot be satisfactory healers of the sick, but we do not study anatomy merely for the sake of pathology or pathology merely for the sake of cure. The main thing in a purely professional education is that the practitioner should have a *scientific interest* in his work. . . . There is nothing we want so much as to have an abiding interest in our ordinary work, and it is only *scientific interest* that can prevent it from becoming monotonous, stale and unclean. . . . A mere recognition of symptoms, and a book of prescriptions, added to a pleasant manner may make a student a financially successful practitioner, because, unfortunately, the general public cannot understand what more is required, but from an educational point of view a doctor who confines himself to that is simply a legalized quack.

These are wise words, and worthy of remembrance by every medical student and every practitioner of medicine.

As testimony to Watson's teaching in the dissecting room (Watson never lectured in a lecture theatre) I quote the tribute of an old student of his:

> Watson was a teacher of no usual type. In vivid language and with rapid sketches on the black-board, he taught with a dramatic intensity that compelled the attention of his class. The anatomy he taught was largely surgical anatomy, and he would illustrate his subject with unqualified descriptions of the surgical triumphs and disasters of our surgical teachers and of others.

When he was amused, Watson's face radiated delightfully what he felt. On occasion he was quick to anger. A student of his, in imitation of a distinguished uncle, grew

FIGURE VI.

Reproduction of McInnes portrait now in the Council Room, University of Adelaide.

a beard, which to his fellow students was an object of detestation. One day four of them seized him, laid him on a dissecting room table and shaved him. At that awkward moment the bearded professor appeared on the scene and exploded. It was, I surmise, this unpleasant excursion into barber surgery that led one of the culprits, a distinguished past-president of the Royal Australasian College of Physicians, Sir Charles Blackburn, to specialize in medicine. Dr. Julian Smith, another of the culprits, later repented him of the evil and grew a beard himself.

Lawson Tait's treatment of the ovarian cyst pedicle at the time when he introduced it was a great technical advance, and as I have related, a dramatic reduction in the death rate of ovariotomy ensued; but the use of a single stout silk ligature, which crushed all the structures, was crude, and the procedure was fraught with the risk of intraabdominal complications in the future. In contrast, Watson's anatomical and æsthetic sense led him to adopt a more precise and gentler procedure. He taught that the blood supply of the ovary should be controlled by incision of the peritoneum and meticulously careful ligation of the blood vessels. He preceded Moynihan in teaching that the surgeon's handling of the tissues should be in the nature of a caress and not of a crush.

Sir Thomas Dunhill had a high regard for Watson's anatomical and surgical attainments, and during his recent visit to Australia I discussed them with him. He said that Watson's teaching (and I agree) was distinguished by the following three principles: (i) To operate without needless damage of the structures. To approach the site the surgeon has in mind through an anatomical plane rather than by division of a muscle or muscles. (ii) To approach the site of a purulent collection in the pelvis from the periphery, where the anatomical relations are capable of identification, and not masked as they are towards the centre of the infected area. (iii) As the first step in an extirpatory operation, to control hæmorrhage by ligation of the vessels which furnish the blood supply of the diseased organ or structure to be excised.

Watson's interest in surgery, wide though it was, was attracted to the surgery of the abdomen, and more especially to that of the female pelvic organs. His interest in these ran like a thread throughout his active professional career and, as has been mentioned previously, his thesis for the degree of doctor of medicine at Göttingen was on hysterectomy. Then, too, he was private assistant to Terrier in Paris, and during the four years he spent in England his interest was quickened by Lawson Tait's work and by that surgeon's successes in the treatment of suppuration in the female pelvis and of ruptured tubal gestation. It was therefore natural that his surgical associations in Australia were chiefly with those who specialized in the diseases of women—E. W. Way, J. A. G. Hamilton and A. F. Lynch in Adelaide, M. U. O'Sullivan in Melbourne, Ralph Worrall and Constance D'Arcy in Sydney. Many of the leading general surgeons in Australia and overseas valued his surgical wisdom. Watson's contributions to surgical literature were sparse, an article on hydatid disease in *Surgery, Gynecology and Obstetrics* being the most important. The operating theatre and the dissecting room were where he taught. The result is that much of his wisdom has died with him and with those surgeons now dead whom he taught. His surgical merits were recognized by the Royal Australasian College of Surgeons, which offered him its honorary fellowship in 1928; but ill health prevented him from receiving it.

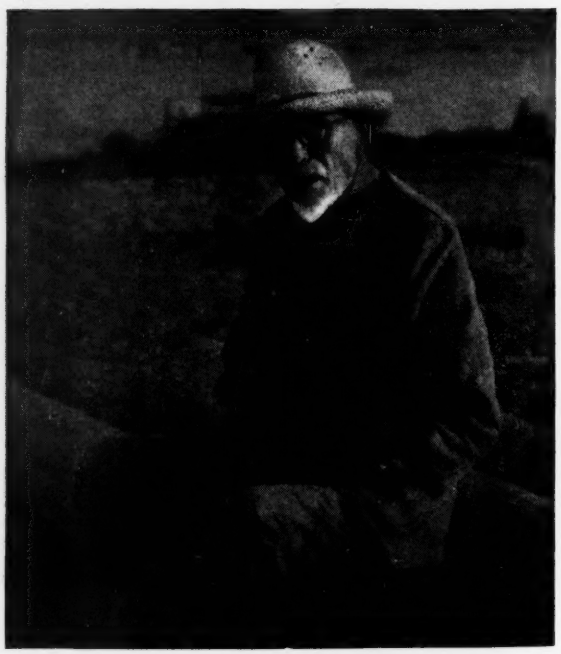

FIGURE VII.

Archibald Watson. Photograph taken in August, 1938, when he visited Torres Straits. Photograph by Mr. Len Schultz.

Dr. R. O'Sullivan, of Melbourne, who, like his father, saw much of Professor Watson, eulogized him in these words:

> His knowledge of surgical anatomy was uncanny, and he had studied the question of surgical approach to such a degree that it is a great pity that his knowledge, and the benefits of his experienced work, died with him. His surgical ideal was a knowledge of anatomical planes associated with a surgical approach, which was attained with a minimum of damage to nerves and blood vessels, and as a consequence herniæ following his methods of surgical approach are practically impossible. He was an extraordinarily able draughtsman, and his note-books, between 80 and 90, contain most intimate details of every operation he saw, because he was practically never without a note-book and fountain pen and pencils to make efficient diagrams.

Watson was not always a helpful or kindly critic. His outspoken comments in the course of watching an operator of whose procedure he disapproved were apt to be discouraging, if not disconcerting. On one such occasion he said, as he peered over the surgeon's shoulder: "If you want to know what he died of, I'll tell you when I do the post-mortem tomorrow."

Finally, in the attempt to limn in words the picture of a great man, let me quote the summaries of two who knew him well. One tribute reads as follows:

> Watson was an interesting old chap with a lot of good and a lot of savagery. When Archie swore he did so with aplomb. His buccaneerish ways and professional learning were a combination that had its appeal to some. He was a picturesque and sometimes a slightly picaresque character, and I am glad he was a member of our rather drab-minded profession. I enjoyed him and respected the wideness of his knowledge. I am sorry our gaiety is not more often awakened by his like.

The second and final tribute, which must serve as mine too, is this:

> Right up to his 91st year Watson retained a keen mind on all subjects. He died in his sleep at Thursday Island. He was moody and disgruntled at times, but would react to the stimulus of discussion, and throw off the dark shadow of regret of the past. He called these moods "whipping the cat", and appeared gloomy indeed. Quickly his puckish humour would assert itself in no uncertain tone, and he would be himself again. It is apparent that to many Watson was an eccentric and rather loose-tongued Professor of Anatomy. His mordant wit could disconcert the most pompous of his colleagues. He fought the battle of life fearlessly and triumphed over his life's handicap. His memoirs would have been a priceless historical document. He was a great man, and his greatness was of the type that will never again be seen amongst men.

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A STREPTOMYCIN SENSITIVITY TEST.

By A. G. MATHEWS and MOIRA L. SHELTON,
From the Commonwealth Serum Laboratories, Melbourne.

AMONGST other causes of failure of streptomycin therapy mentioned in a report by Keefer *et alii*[11] were these: firstly, use of the drug in the treatment of infections by those bacteria which continue to multiply in the presence of the greatest concentration of streptomycin which can be maintained in the tissues; and secondly, increase in resistance of organisms originally relatively sensitive. Several other workers have drawn attention to the rapidity and degree of development of resistance, both *in vivo*[5][6][8][9][15][21] and *in vitro*.[5][10][12][14][15][20]

These reports emphasize the need for laboratory control of streptomycin therapy, and in particular, for a simple test to determine the relative sensitivity of the causative organism. The purpose of this paper is to review some methods which have been employed by others, to describe a simple medium which has been used in a modified test at these laboratories, and to discuss some factors which influence the results of such tests.

Methods Described by Others.

Finland, Murray and their co-workers[9][15] prepared serial dilutions of streptomycin in infusion broth and inoculated these with the bacterium under test so as to give a density of between 50,000 and 150,000 organisms per millilitre. The least concentration of streptomycin which prevented growth after incubation for twenty-four hours, followed by subculture on streptomycin-free agar, was defined as the minimum inhibiting concentration; but it would seem that such a test is concerned with the lethal, rather than the inhibitory, effect of the antibiotic.

Buggs *et alii*[6] proposed a two-stage method, the second part covering a narrower range of concentrations, at smaller intervals, than the first ("screening") test. In the preliminary test, serial twofold dilutions of streptomycin in nutrient broth were inoculated with a 1 in 10,000 dilution of an eighteen to twenty-four hour culture. In the more accurate test, double-strength broth was inoculated and diluted with streptomycin solutions of appropriate concentrations so as to make a final inoculum of 500 to 5000 organisms per millilitre.

Edwards and Kirk[8] streaked the infecting bacterium on agar containing known concentrations of streptomycin, and reported both the highest concentration resulting in growth and the lowest concentration resulting in inhibition after incubation for twenty-four hours.

Miller and Bohnhoff[14] inoculated blood agar plates containing known concentrations of streptomycin with cultures of *Neisseria gonorrhœæ* and *Neisseria meningitidis*. The limit of tolerance of the organisms was taken as the highest concentration of streptomycin permitting the appearance of any colonies within forty-eight hours.

Alexander and Leidy[2] inoculated Levinthal agar plates containing varying concentrations of streptomycin with six-hour cultures of *Hæmophilus influenzæ*. The lowest concentration of the drug preventing visible growth after forty-eight hours of incubation was designated as the minimal effective concentration.

Method Employed at These Laboratories.

In principle, our method consists in the determination of the ratio of the least concentration of streptomycin which will inhibit growth of a reference organism, to the least which will inhibit growth of the bacterium under test, the comparison being made under standardized conditions. This ratio represents the sensitivity of the bacterium under test, in relation to that of the reference organism. Equally well, of course, one could determine the ratio of the greatest concentration which will permit growth of the organism under test to the greatest which will permit growth of the reference organism; this would represent the resistance of the bacterium under test in relation to that of the reference organism. If the concentrations employed in the test are spaced at geometrically equal intervals, this latter "resistance" ratio will be the reciprocal of the "sensitivity" ratio. The purpose of the reference organism is to act as a check on uncontrollable variation in the medium and technique over a long period, and to minimize the effect of differences in size of inoculum.

In detail, two lots of the basal medium, both enriched if necessary, are uniformly inoculated with suspensions, of which the opacities have been matched, of sixteen to twenty-four hour cultures of the bacterium under test, and of the reference organism. The density of the suspension of the reference organism is adjusted, before matching with the other suspension is carried out, so that each tube of the reference series will contain a final inoculum of 50,000 organisms per millilitre. A solution of streptomycin in phosphate buffer solution at pH 6·0 is diluted in phosphate buffer solution at pH 7·9, so as to contain double the concentrations required in the test. One millilitre of each appropriate dilution of streptomycin is mixed with one millilitre of inoculated medium in uniform test tubes of half-inch diameter. The tubes are incubated and examined after twenty-four hours for visible growth. The least concentration of streptomycin preventing visible growth is taken as a measure of the sensitivity of the bacterium. The value for the reference organism is divided by that for the organism under test in order to obtain the sensitivity of the latter in relation to that of the former.

The basal medium is prepared as follows: tryptone, 10 grammes; meat extract ("Lemco" Laboratories), 5·0 grammes; sodium chloride, 2·5 grammes; dipotassium monohydrogen phosphate, 3·7 grammes; monopotassium dihydrogen phosphate, 1·3 grammes; distilled water to 1000 millilitres. Adjust the reaction with sodium hdroxide before autoclaving, so as to obtain a pH of 7·9 ± 0·1 after autoclaving. This medium may be enriched if necessary by the addition of 10% to 20% of horse serum, 0·002% of the V factor (diphosphopyridine nucleotide),[19] 10% of glycerol *et cetera*. The stock solution of streptomycin in phosphate buffer solution at pH 6·0 may be kept for one month if stored at a temperature less than 10° C.[18]

The reference organism used by us is *Staphylococcus aureus* B.313 (Number 6538 of the American Type Culture Collection). The culture is maintained by fortnightly transfer on nutrient agar, the subcultures being incubated at 37° C. for twenty-four hours and stored in the refrigerator. The culture is occasionally plated out, and a large, bright orange colony is selected for subculture. To prepare the inoculum for the test, nutrient broth is inoculated from a culture on agar, incubated at 37° C. for sixteen to twenty-four hours, and used immediately.

Experimental Work.

Throughout this work concentrations of streptomycin at twofold steps have been used, and all tests have been

performed with duplicate sets of tubes. The duplicates have been consistent in every case not especially mentioned.

Suitability of the Medium.

The basal medium, diluted with phosphate buffer solution, permitted visible growth within twenty-four hours of the following bacteria, the number of strains tested being indicated in each case: *Staphylococcus aureus* (2), *Bacterium coli* (12), *Bacterium typhosum* (2), *Bacterium paratyphosum* A (2), *Bacterium paratyphosum* B (2), *Bacterium aerogenes* (2), *Bacterium flexneri* (1), *Klebsiella pneumoniæ* (3), *Proteus vulgaris* (5), *Pseudomonas pyocyanea* (3), *Neisseria catarrhalis* (2), *Chromobacterium prodigiosum* (3), *Bacillus circulans* (1), and *Bacillus subtilis* (1).

Upon enrichment of the diluted medium with 5% to 10% of horse serum, visible growth of these additional organisms occurred within twenty-four hours: *Neisseria meningitidis* (8), *Neisseria gonorrhœæ* (1), *Streptococcus pneumoniæ* (12), *Streptococcus viridans* (6), *Streptococcus pyogenes* (28), *Brucella abortus* (1), and *Corynebacterium diphtheriæ* (3).

Growth of *Hæmophilus influenzæ* (three strains) took place within twenty-four hours upon the addition of 0·001% of the V factor to the diluted medium.

Effect of pH.

The basal medium was inoculated with 100,000 organisms per millilitre of a sixteen hour culture of *Staphylococcus aureus* B.313. Portions were then mixed with equal volumes of solutions of streptomycin in phosphate buffer solution at pH 7·9. The pH of each mixture was adjusted to a known value by the addition of sodium hydroxide or hydrochloric acid. The least concentrations required to prevent visible growth after incubation for twenty-four hours were as shown in Table I.

TABLE I.

Least Concentration of Streptomycin (in Microgrammes per Millilitre) Required to Inhibit Growth of Staphylococcus aureus *at Several Values of pH.*

pH.	Concentration.	pH.	Concentration.
6·0	8	7·8	1
6·4	8	8·0	1
6·8	4	8·2	1
7·2	2	8·5	1
7·6	2	8·8	0·5

Effect of Size of Inoculum.

A decrease of sensitivity to streptomycin with increase in size of the inoculum was demonstrated in the case of several bacteria in the range 500 to 500,000,000 organisms per millilitre (see Table II). The results with *Streptococcus viridans* suggest the presence in the cultures of a proportion of highly resistant organisms.

Effect of Enrichment of the Medium.

The addition to the diluted basal medium of 5% of horse serum or of 0·001% of the V factor caused no change in the end-point with *Staphylococcus aureus*, as may be seen from Table II.

Sensitivity of Several Bacteria.

The sensitivity of each of the strains listed in Table III has been determined in relation to that of *Staphylococcus aureus* B.313. As the least concentration of streptomycin required to prevent growth of the latter has been constantly one microgramme per millilitre, the reciprocals of the figures given in the table represent the least concentrations of streptomycin, in microgrammes per millilitre, required to inhibit growth of these organisms under the experimental conditions.

TABLE III.

Relative Sensitivities of Certain Bacteria to Streptomycin in Relation to that of Staphylococcus aureus.

Species.	Relative Sensitivity.
Bacterium coli (one strain)	$< \frac{1}{64}$
Bacterium coli (two strains)	$\frac{1}{4}$
Bacterium coli (one strain)	$\frac{1}{4}$ or $\frac{1}{2}$[1]
Bacterium coli (one strain)	1
Proteus vulgaris	$\frac{1}{4}$
Pseudomonas pyocyanea (one strain)	$\frac{1}{4}$
Pseudomonas pyocyanea (one strain)	$\frac{1}{32}$
Hæmophilus influenzæ	4
Streptococcus pneumoniæ (Type IV)	$\frac{1}{16}$
Streptococcus viridans (two strains)	$\frac{1}{4}$
Bacillus circulans (American Type Culture Collection 9966)	1 or 2[2]
Bacillus subtilis (American Type Culture Collection 6633)	2

[1] Determinations made on different days.
[2] This organism grows slowly. The results reported are from the duplicates read after twenty-four hours. Upon incubation for a further twenty-four hours, the relative sensitivity indicated by each set of tubes was 1.

Reproducibility of Results.

In an attempt to demonstrate the effect upon the reproducibility of the end-point of possible large variations in resistance of individual cells in a twenty-four hour culture of *Staphylococcus aureus* B.313, 300 tubes were prepared each containing one millilitre of the basal medium, one millilitre of a solution of streptomycin in buffer solution at pH 7·9, and 100,000 staphylococci. The final concentration of streptomycin in each of 100 tubes was 0·5, 1·0 and 2·0 microgrammes per millilitre respectively. After incubation for twenty hours, every tube containing 0·5 microgramme per millilitre showed growth, but none of the tubes containing the higher concentrations showed growth after thirty-six hours.

As well as in the above experiment, the least concentration of streptomycin required to inhibit growth of *Staphylococcus aureus* B.313 under the conditions of the test

TABLE II.

Least Concentration of Streptomycin (in Microgrammes per Millilitre) Required to Inhibit Growth of Several Bacteria, from Different Inocula (in Organisms per Millilitre), in the Diluted Basal Medium with Various Additions.

Inoculum.	Species.							
	Staphylococcus aureus, Strain B.313.			*Bacterium coli.*		*Streptococcus viridans.*		*Hæmophilus influenzæ.*
				Strain 38.	Strain 64.	Strain "Powell".	Strain "David".	
	Addition to Medium.							
	None.	5% Horse Serum.	0·001% V Factor.	None.	None.	5% Horse Serum.	5% Horse Serum.	0·001% V Factor.
500,000,000 ..	16	16	16	32	32	64	64	4
50,000,000 ..	8	8	8	8	16	64	8	2
5,000,000 ..	4	4	4	4	4	8	4	1
500,000 ..	2	2	2	2	2	4	4	0·5
50,000 ..	1	1	1	2	1	4	4	0·25
5,000 ..	0·5	0·5	0·5	1	1	2	2	0·25
500 ..	0·5	0·5	0·5	1	1	1	2	0·125

has been found to be one microgramme per millilitre in each of the thirty tests performed.

Discussion.

Nature of the Medium.

The antibacterial activity of streptomycin has been reported to be enhanced in a poor medium.[3][18] Also, attention has been drawn to the presence in infusion media, and to the absence from extract media, of a substance (possibly a reducing agent) inactivating streptomycin.[4][18] These considerations led us to adopt a basal medium, incorporating meat extract, as simple as would permit the growth of a wide variety of bacteria. In view of a report[7] on the unsuitability of certain batches of tryptone for assay purposes, it may be wise to reserve for this test a large amount of a single batch found to be satisfactory.

The increase of antibacterial activity of streptomycin with decreasing acidity of the medium has been reported by several workers.[1][13][17][20] The existence of this effect makes it necessary to employ a medium of constant pH in all tests. We chose pH 7·9 as being the highest value consistent with growth of most of the common pathogens. Also, the effect of size of inoculum on streptomycin activity appears to be slightly less at pH 8·0 than at pH 6·0 or pH 7·4.[1] We decided to buffer the medium in order to facilitate the adjustment of its reaction and to minimize the effect of growth on the pH. Phosphates were chosen for this purpose, in view of a report that phosphates increase the activity of streptomycin and reduce the effect of other salts on its activity.[13]

The oxidation-reduction potential of the medium also appears to be important. For instance, Bondi *et alii*[4] showed that the bacteriostatic power of streptomycin was reduced (i) in agar incubated anaerobically, and (ii) in broth in the presence of thioglycollate, cysteine, veal infusion and several inorganic reducing agents. Therefore we have avoided the use of such enrichments as glucose, and have used a moderate depth of medium in test tubes of uniform bore.

Reports on the effect of serum and other body fluids on the activity of streptomycin are conflicting. Keefer *et alii*[11] state that from four to eight times as much streptomycin is required to inhibit bacteria in the presence of blood or plasma as is required in a blood-free medium. On the other hand, Donovick *et alii*,[7] working with *Klebsiella pneumoniæ*, report that the activity of streptomycin is increased by 30% to 40% in the presence of human or other sera. Other workers state that the activity of streptomycin against several bacteria is not affected by body fluids. Our work merely demonstrates the absence of any large effect of horse serum on the activity of streptomycin against *Staphylococcus aureus*.

Size of Inoculum.

Abraham and Duthie[1] showed in the case of several bacteria, at several values of pH, that the concentration of streptomycin required to inhibit growth in broth was increased when the inoculum was increased a thousandfold. This effect, although apparent at pH 8·0, is not quite so pronounced at the higher pH as it is at pH 7·4 or pH 6·0. As our results with *Staphylococcus aureus* at pH 7·9 show a regular change of end-point with the size of the inoculum, the choice of the latter for the standardized test is arbitrary. We followed Finland *et alii*[9] in adopting 50,000 organisms per millilitre as the standard inoculum. It seems more convenient to match the suspension of the bacterium under test with that of the reference organism, and then to dilute each to the same extent, than to adjust each suspension separately to the required density.

Variations in Resistance in the Bacterial Population.

The existence of a small proportion of very resistant cells in a population of low modal resistance has been demonstrated in the case of strains of some Gram-negative bacteria.[5][12] The result of our attempt to reveal any such variations in a culture of *Staphylococcus aureus* was negative, but, of course, resistant variants might have been detected had a larger total number of cells been examined.

Caution in Drawing Inferences from Result of a Test.

The necessity for exercising caution in interpreting the result of a test may be emphasized by the following considerations.

1. The pH at which the test is performed is arbitrary, and the sensitivity of the bacterium under test may not vary with the pH in the same manner as does that of the reference organism. Due regard should be paid to these facts, especially when infections are being treated at sites where acid conditions may prevail, in damaged tissues[1] or in the urinary tract, for instance.

2. The size of the inoculum used in the test is arbitrary, and bears no relationship to the concentration of organisms which may occur in the tissues.

3. Very resistant bacteria may occur in small numbers in a generally sensitive population. With the size of inoculum used, the existence of such variants will frequently remain undetected.

4. The effect of body fluids on the activity of streptomycin against many bacteria is not known.

Summary.

A method of determining the relative sensitivity of a bacterium to streptomycin is described in detail. The method employs a reference organism, and a new simple medium which supports the growth of most of the common pathogens.

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SURGICAL ASPECTS OF POST-OPERATIVE TREATMENT.[1]

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LORD MOYNIHAN once stated that "surgery has been made safe for the patient; we must now make the patient safe for surgery". I believe that all will agree with this rather sweeping statement. Recourse to the practice of physiological principles proven at the beginning in the laboratory and confirmed later by the bedside after careful clinical observation has enabled the modern surgeon to undertake operations such as pneumonectomy, complete or partial removal of the pancreas and the like.

It is not my purpose tonight to talk about post-operative treatment in detail, for this is obviously impossible in such a short space of time. Nor will I dwell upon the practices so commonplace to us all; rather shall I deal with the manœuvres used by the modern surgeon to fortify his patients in their hour of need and the basic principles upon which these aids are founded.

The combating of shock, the maintenance of fluid balance, the promotion of tissue repair, the prevention of infection, the checking of thrombosis and the return of the patient to full functional activity are the aims of the surgeon in addition to the eradication of the disease. Further, it must not be forgotten that the requirements of the aged are different from those of the young in most respects.

The Combating of Shock.

The term "shock" is difficult to define, but the syndrome is well known to all. Perhaps the simplest definition is a "state of collapse of the circulation". It is associated with a diminished force of the heart beat and fall of blood pressure, with dilatation of the capillaries which allows plasma to escape into the tissues, and with a diminished blood volume which is encouraged by sweating, vomiting and hæmorrhage.

The theories of the causation of shock are legion, but whatever be the cause or causes it is known that the individual develops certain well-recognized symptoms and physical signs, and that if these are adequately met the shock mechanism becomes reversed and usually after a few hours the signs and symptoms disappear.

Clinical observation of the patient and appreciation of the findings are helpful. An expression of intense pain is a forerunner of shock, while the Hippocratic facies is an indication that an extreme degree of shock has developed. The skin is moist and clammy, while the expired air felt by the examiner's hand is cool as though the internal fires are dying down to extinction. The pulse rate and its compressibility are accurate signs. In moderate shock the pulse rate may be doubled, yet the compressibility indicating the pulse pressure and the systolic element may be unchanged. In severe shock the pulse is thin and running and only the lightest palpation will elicit its presence.

The more technical devices, however, lend greater aid in the appreciation of the degree of shock, and the findings so obtained point out the measures necessary to overcome the condition.

In 1919 Cuthbert Wallace recognized that the sphygmomanometer gave a fairly accurate picture of the blood lost from the circulation. He estimated that a blood pressure below 90 millimetres of mercury indicated a reduction of two litres in the blood volume, while below 60 millimetres of mercury three to three and a half litres were lost, that if this condition persisted for a few hours the resulting damage to the central nervous system could not be repaired and that such a state could not be reversed.

In shock not resulting from hæmorrhage the hæmatocrit and hæmoglobin estimation should be used in the determination of the plasma lost from the circulation.

The Harkin formula for the use of the hæmatocrit is the simplest. It rules that the normal hæmatocrit reading is 45, and that for every point rise above this figure 100 millilitres of plasma are lost to circulation. As a practical guide to treatment I would suggest that with a rise of five to ten points 250 millilitres of plasma or serum should be given rapidly and that the remainder of the dose be run into the circulation by the drip method over the next few hours, when a further reading should be obtained and treatment determined accordingly.

If the hæmatocrit is not available the hæmoglobinometer should be used as a somewhat rougher guide. Its use is based on the principle that plasma loss leads to concentration of red cells with a higher hæmoglobin percentage finding. It is estimated that every one point rise above the normal 95 tells of a loss of 40 millilitres of plasma from the circulation.

In emergencies when plasma or serum is not immediately available glucose-saline solution can be used temporarily. If too much of this solution is used, there will be a further loss of total protein from the blood, which will have to be replaced.

It will be noticed that I have not mentioned rest, judiciously controlled external warmth or the relief of pain in the treatment of shock. These measures are so well known to you that they are only mentioned. A warning, however, must be given about the sensitivity of some patients to morphine and the consequent vomiting. When this is sensed, morphine can be replaced by "Dilaudid" one-thirty-second of a grain, "Pantopon" one-third of a grain, or codeine sulphate one-quarter to one grain.

The Maintenance of Fluid Balance.

In health the needs of the body for fluid are cared for automatically. Post-operatively the patient is often not able, nor permitted, to take fluid in the usual manner. Further, the patient may have lost and still be losing fluids in large amounts daily in an abnormal fashion, as from a draining wound, through post-operative vomiting or from a high intestinal fistula.

Unless the surgeon sees that there is an adequate intake of fluid and salt, dehydration and hypochloræmia may be the deciding factors between recovery and death.

For the rational management of fluid balance it is necessary to possess a clear understanding of the fluid requirements and the nature and quantity of fluid deficits.

The distribution between the various reservoirs is associated with a complex series of mechanisms which involve the circulation of the blood, the semi-permeability of capillary and cell walls and the level of plasma proteins. It is by reason of the osmotic pressure exerted by the plasma proteins that the escape of fluid from the capillaries into the surrounding tissues is prevented.

In malnutrition, excessive purulent drainage and extensive loss of serum in burns, the normal level of 6·5 to 7·5 grammes per 100 millilitres of plasma may become so lowered that œdema can result when the level reaches the neighbourhood of 5·2 grammes per 100 millilitres of plasma. However, if excessive amounts of salt or water are given, œdema may develop well above this level.

Coller and Maddock have shown that after an operation the patient of average weight loses 1500 millilitres of

[1] Read at a meeting of the Victorian Branch of the British Medical Association on April 20, 1947, at Ballarat.

fluid a day in the form of water vapour from the lungs and skin. Further, in order to allow for adequate elimination of waste products, the urinary output should be 1500 millilitres per day. To the combined total of the above amounts must be added the amounts of fluid lost in the form of blood, vomitus and stool, from external biliary or intestinal fistulæ and by any suction drainage from the gastro-intestinal tract, and the intake should equal the sum of these amounts.

In the calculation of fluid requirements, attention must be given also to the contents of the fluid replacement. If the chlorides of the body fluids are allowed to fall to low levels, serious disturbances take place in the metabolism of protein and in the chemical content of the blood. As soon as a severe chloride deficiency is established there is an enormous breakdown of protein accompanied by an increase in the production of urea and nitrogenous wastes. So rapid is this effect that the kidneys are unable to excrete the wastes and uræmia may develop. Further, it has been shown that a low chloride level and a high blood urea level lead to poor wound healing.

Bartlett and his co-workers have developed a clinical rule for the quantity of sodium chloride necessary for replacement to attain a normal level. This is stated as follows: "For each 100 milligrammes that the plasma chloride level needs to be raised to reach the normal (560 milligrammes *per centum*), the patient should be given 0·5 gramme per kilogram (or 0·2 gramme per pound) of body weight."

In cases of impaired renal function, or in the surgical case in which the patient is seriously ill, the requirements of sodium chloride are less, and if sodium chloride is pushed to any extent, visible œdema occurs, which is an external manifestation of a complete body œdema with harmful effects upon the internal organs.

In addition to the salt required for cellular metabolism, dextrose should be given to furnish readily available carbohydrate for energy requirements, for glycogen formation and for oxidation of ketone acids if they are present. It is, therefore, the usual practice to give intravenously as a start normal saline solution containing 5% of dextrose.

However, in the absence of abnormal losses of sodium chloride, the amount of salt solution given as a hydrating fluid should not exceed 1000 millilitres of normal saline solution per day (nine grammes). The remainder of the fluid necessary should be 5% dextrose solution in distilled water, unless there is severe hyperthyreoidism, liver damage, cachexia or inanition, when a 10% solution of dextrose in distilled water is advised, which will furnish 400 Calories per litre.

In the case of patients requiring long-continued intravenous hydration hypoproteinæmia must be guarded against, and half a litre of plasma is recommended every forty-eight hours. In such cases the vitamin B_1 reserves are called upon heavily for the metabolism of dextrose.

I have dealt with the intravenous hydration of patients, because the care required in the administration of fluids is great in the treatment of the sick. For those not so ill, fluids by mouth or the rectal administration of tap water in the first twenty-four to thirty-six hours after operation will always hold pride of place with all but the meddlesome surgeon as a method of maintaining the fluid requirements.

The Promotion of Tissue Repair.

The promotion of tissue repair or wound healing is an absorbing subject. It has occupied the minds of such former masters of the surgical art as Kocher, Halsted, Kanavel and more recently Whipple and his associates.

Every wound, whether produced intentionally or otherwise, destroys or injures tissues in some degree. The process known as wound healing is a natural response to the stimulus of injury. The great principle in the treatment of wounds is that in their making tissue damage should be minimized, and that former natural relationships should be restored as nearly as possible.

The failure of a wound to heal normally by first intention may be due to factors affecting the body as a whole or to conditions in the wound itself. In most instances the failure of proper healing is due to a combination of several factors. Among these various factors are the following: (i) the presence of bacteria in the wound; (ii) the presence of devitalized tissue; (iii) the presence of other foreign material including ligatures, sutures and drains; (iv) the presence of hæmatoma; (v) undue tension and strangling of tissues by improper suturing; (vi) the lack of accurate approximation of tissues; (vii) failure to obliterate dead spaces; (viii) inadequate immobilization of the part; (ix) peripheral circulatory failure; (x) malnutrition including hypoproteinæmia and avitaminosis; (xi) the presence of infections or advanced debilitating diseases which affect the body as a whole. It can be seen that most of the factors mentioned are concerned with pre-operative care and operative technique.

I shall deal with the general care of the wound and the complications that may ensue and shall discuss their treatment, for they alone concern us in the post-operative period.

Dressings need not be disturbed as a general rule until the time for the removal of sutures. It is the tendency for all clean wounds to heal by first intention. After any aseptic operation there is usually a post-operative rise in temperature to the neighbourhood of 99° to 100° F. If this rise persists beyond the third post-operative day, or if a secondary rise in temperature occurs, the wound should without delay be inspected with due aseptic precaution and treatment instituted accordingly. When drainage has been resorted to, inspection is required earlier, and fresh dressings must be applied as necessary to prevent irritation and maceration of the skin.

The removal of sutures from the skin is usually accomplished on the seventh day, while the deep through-and-through tension sutures are taken out on the twelfth day. When the blood supply is abundant, as in the face and scalp, sutures should be removed much earlier.

In the case of the aged, debilitated or cachectic patient, both superficial and deep sutures are left intact for longer periods. It is important to remember that the tensile strength of a freshly sutured incision is high during the first two or three days when the sutures are firmly in place and have not as yet cut through the tissues. As non-absorbable sutures cut through the tissues and catgut loses its strength, the wound becomes weaker. By the fourth day the tensile strength is much lower than on the first day. Thereafter, however, healing progresses rapidly and the strength of the wound increases.

A hæmatoma in the wound requires scant comment, for it is obvious that its early aseptic elimination is called for.

The Prevention of Infection.

Infection of a wound in a "clean case" requires not only reflective recrimination on the part of the operating theatre team, but also most certainly definitely planned treatment. The prevalent present-day tendency to resort to the soporific antibiotic or chemotherapeutic umbrella without bacteriological control and investigation as to its value is to be deplored. Such action is both wasteful and unscientific. It may be valueless to the patient, but satisfying to the relatives, who will be content that all has been done, while the surgeon will be left lamenting his failure.

Cellulitis, the least common of wound infections, is streptococcal in origin and occurs relatively soon after operation. The temperature soars to 102° or 103° F. and the wound is surrounded by a red indurated area. Recourse to sulphonamides or penicillin is made after bacteriological samples are obtained. Some sutures usually require to be removed and the application of hot moist dressings is helpful.

The common localized infection is ushered in with a continuously elevated temperature or a secondary post-operative rise, while obvious infection of the wound to inspection is not present. Careful palpation will determine the tender area indicating the depth to be probed and the suture to be released. With adequate treatment such localized collections frequently clear up readily if drainage is adequate.

The Checking of Thrombosis.

One of the post-operative complications with unpleasant possibilities is venous thrombosis. The resultant obstruction to the venous return, though incapacitating for varying periods, does not endanger the part as a rule owing to the abundant collateral channels present by means of which the blood may be returned to the heart. However, the condition is a threat to the patient's life, since the thrombus may become detached and produce a massive pulmonary embolus resulting in death.

At the outset it is as well to have a clear understanding of the terms current in the literature used to describe the different pathological and clinical entities of venous thrombosis. The term "thrombophlebitis" is used to describe intravascular clotting associated with an inflammatory process in the vein wall. "Phlebothrombosis", on the other hand, denotes partial or complete venous occlusion by an intravascular clot which is unassociated with inflammation, the clot being loosely held to the vein wall. The mechanism of clot formation in the two types of venous thrombosis is entirely different.

In thrombophlebitis, as a result of inflammation, there are changes in the vascular endothelium. The inflammatory cause may be involvement of the vein from perivenous lymphangitis or some toxic or allergic sensitization. As a result the clot is of the whole or mixed variety and is firmly attached to the vein wall. Apart from two exceptions, embolus is not a feature. The first exception can occur when a red thrombus is formed proximal to the area of thrombophlebitis, and the second when suppurative thrombophlebitis occurs and the clot becomes liquefied owing to proteolytic ferments and permits fragments to be broken off.

In phlebothrombosis there is no inflammatory process and the clot is the result of increased coagulability of the blood and the slowing of the circulation. The clot formed is red and is only loosely attached to the venous wall and does not always entirely fill the lumen. It is thought that the products of tissue injury favour blood clotting and the precipitating factor is circulatory stasis. The conditions necessary to its formation are amply satisfied post-operatively—tissue injury, the resting of the patient in bed in a "head up knee up" position, the consequent comparative lack of muscular movement particularly in the lower limbs, the disinclination to breathe deeply especially after abdominal operations, and consequent lowering of the negative pressure within the thorax, all retard the return of blood from the distant parts.

The clinical picture of thrombophlebitis is clear and well defined. The temperature is elevated. There are pain in the involved extremity and, with few exceptions, swelling, while colour changes of the extremity are significant. In the more usual superficial venous involvement the area overlying the vein is red and warm, while in the rarer deep vein involvement the leg is white and the limb is cool.

In phlebothrombosis, the signs and symptoms are conspicuous by their almost complete absence. The patients occasionally complain of a feeling of impending disaster. The diagnosis is made by suspecting the incident and by routine examination. The calf muscles and plantar aspects of the feet should be palpated for tenderness. Homans describes the sign of the production of pain in the calf or popliteal space on dorsiflexion of the part as indicative of phlebothrombosis.

The initial treatment in venous thrombosis is prevention by pre-operative correction of any unphysiological state in elective operations. Care during the operation is taken to avoid unnecessary tissue damage and any circulatory collapse.

The post-operative reestablishment of blood volume and early muscular activity are essential.

The prevention of abdominal distension by the indwelling Ryle's tube, the avoidance of tight abdominal bandaging and the head-low position in bed during the unconscious period will help to obviate stasis of blood in the lower extremities.

Ochsner recommends that the use of anticoagulants such as heparin and "Dicumarol" should be reserved for patients who have a previous history of thrombosis. In any event their proper employment is dictated by the proximity of a well-equipped laboratory.

The active treatment depends on the type of venous thrombosis present.

It has been shown that in thrombophlebitis the blocking of the first, second, third and fourth lumbar ganglia with five millilitres of a 1% solution of procaine relieves the pain-producing factor of arterial spasm; the temperature falls and the patient is spared the persistent manifestations of œdema and ulceration. I personally have no experience of this measure.

In the case of phlebothrombosis, Ochsner states that since the clot is only loosely attached to the vein wall, immediate surgical intervention is desirable when such a diagnosis is made. This, he states, should consist in either ligation of the vein above the thrombus or opening of the vein and aspiration of the thrombus proximal to the opening and ligation proximal and distal to the opening. From current literature it would appear that ligation of veins for phlebothrombosis is still in its experimental stage, and we must wait before assessing the long-term value of such a procedure when weighed against the resulting sequelæ.

Conclusion.

In the space of time available I have dealt with but a few of the problems in post-operative treatment. The aspects about which I have chosen to speak leave many gaps, but are broad issues likely to confront all surgeons.

Summary.

Post-operative treatment in general has been discussed. The problems of common knowledge have been omitted. The physiological basis and clinical signs of some of the major post-operative complications have been discussed.

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SOME MEDICAL ASPECTS OF THE POST-OPERATIVE STATE.[1]

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THE post-operative course is modified by many factors, and complications during that period not only affect the morbidity but also cause a very considerable mortality. These facts should stimulate clinical research; but too frequently an adherence to tradition and an unquestioning acceptance of dicta result in complacency and in a feeling, and statement, that all that was possible was done. Such an attitude of mind cannot result in progress, and it is past high time to do something about it.

Pre-Operative Preparation.

The value of adequate pre-operative preparation is acknowledged, and yet immediate operation in a surgical emergency is frequently followed by a smooth post-

[1] Read at a meeting of the Victorian Branch of the British Medical Association on April 20, 1947, at Ballarat.

operative course. Is this due to the patient's leading a normal life on a full mixed diet prior to the onset of illness? Operation performed during or after a protracted illness tends to be fraught with danger. The age of the patient, the sex, the system or systems involved, the presence or risk of infection, the duration of the lesion and the effects therefrom, all influence preparation, technique and recovery. In short, every patient presents an individual problem in management—pre-operative preparation, anæsthesia, operative technique, post-operative course and rehabilitation. The hospital conditions and the training, skill, obedience, devotion to duty, tact and ability to ensure the comfort of their patients possessed by the nursing staff have a profound effect on the patient throughout.

Any operation has a psychological effect on the victim. Anæsthesia has an effect on metabolism; after a general anæsthetic cerebration is retarded. Tissue trauma also disturbs metabolism. Nitrogen, fluid and mineral balance are altered. Ingestion of food and fluids is affected. Blood volume, plasma proteins and oxygen-carrying capacity of the blood may be disturbed. Respiratory activity is altered. Pain, distress and disturbance of sleep are inevitable. Immobilization of varying degree is a resultant.

Adequate pre-operative preparation can and should obviate some of the above effects. In addition to full physical examination of the patient and investigation of the urine, a careful history should be taken and a search made to exclude the presence of active infection. An acute upper respiratory tract infection is usually a contra-indication to operation, but a subsiding infection is less dangerous. Oral sepsis is a menace. Chemotherapy does not provide an excuse for neglecting to note a developing "cold", nor should it permit slackness in post-operative diagnosis of an infection or of a pulmonary lesion. Rest and sleep must be ensured, and full cooperation of the patient is essential. Tests of function as applicable must be performed. Blood proteins, erythrocytes and hæmoglobin should be brought to normal levels if possible, and if blood transfusion is a possibility, the blood groups of patient and donors should be determined. It is of particular importance, if a blood transfusion has previously been given, that the patient's Rh sensitivity should be known.

Comment must be made on possible effects of the indiscriminate use of chemotherapy. The effects on the hæmatopoietic system are well known, but less notice has been taken of the effects of the sulphonamides in depressing propagation of the natural bacterial flora of the bowel. This effect diminishes the natural synthesis of vitamins, for example, vitamin *K* and folic acid, and may affect digestion and absorption.

The Incidence of Post-Operative Complications.

In post-operative care, of great importance are diet, fluids, the relief of pain, sedation, the venous circulation, and the alimentary tract; but particular reference will be made to respiratory complications. The special conditions associated with operations on the thorax will not be considered in this discussion.

King[2] made a statistical study of post-operative chest complications over a period of two years at Massachusetts General Hospital. There were 629 instances of pulmonary complications in 7065 operations (6%). Chest infections occurred in 14% of cases of laparotomy and herniorrhaphy, and followed 7·2% of thyreoid operations. Males were affected twice as frequently as females, and the figures given by King for operative procedures on males were as follows: stomach and duodenum, 46·8%; gall-bladder, 35·6%; intestines, 26·2%; gastrostomy and palliative operation for intestinal obstruction, 22·2%; gastric and duodenal suture, 61·8%; appendicectomy with drainage, 22·5%. Only 14·3% of 426 patients with serious chest complications had pre-operative respiratory infection. In laparotomy and herniorrhaphy the type of anæsthesia (inhalation, spinal, local or combined) produced no difference of statistical significance, and in King's opinion seasonal conditions and pre-operative infection played only a minor part. Cases of severe and fatal disease were usually due to broncho-pneumonia without evidence of atelectasis at any stage. It is evident that operations on the upper part of the abdomen, and particularly those for perforated ulcer when pneumoperitoneum and peritoneal soiling were present before operation, were most frequently followed by respiratory complications.

Brock[1] investigated 85 cases of respiratory complications at Guy's Hospital. Sixty-two patients were males and 23 were females. In all except nine cases the complication followed abdominal operations, and of these nine, in two it followed tooth extraction, in one tonsillectomy, in one laryngofissure, in one an antral operation, in one thyreoidectomy, and in three operation on limbs. Of the 76 cases occurring after abdominal operation, 41 followed operations on the upper part of the abdomen, 19 complicated acute appendicitis and 11 occurred after operations for hernia. Brock found eight types of complications, namely, bronchitis, atelectasis, pneumonia, lung abscess, empyema, subphrenic abscess, phthisis and pulmonary embolus. Of particular interest was the stress which he laid on measures for the prevention and treatment of atelectasis, involving active coughing and posturing in the recumbent position.

The Influence of Posture.

Spalding,[8] supported by Ogilvie,[6] has directed attention to the ill effects of slavish adherence to Fowler's position and to misconceptions regarding the hydraulics of the peritoneal cavity. The force of gravity is not the regulating factor in the passage of fluid in the cavity, and there is convincing experimental evidence that absorption of fluid and of particulate matter is maximum in the sub-diaphragmatic region. The movement of fluid is apparently by capillary attraction and is influenced by movements of the diaphragm and of the abdominal viscera. Subphrenic suprahepatic spaces differ from the rest of the peritoneal cavity also in the degree of variation in pressure with respiration. The pressures vary with intrapleural pressure and not with intraperitoneal pressure. Overholt[7] demonstrated that in dogs the intraperitoneal pressure is greatest in dependent parts of the abdomen, and that "the pressure within the peritoneal cavity decreased simultaneously with the decrease in intrapleural pressure (during inspiration)". Although these experiments were in animals, there is abundant evidence to support their application to the human being, and only large effusions would be influenced by gravity to any extent.

If the above experiments and ideas are correct, it is obvious that the use of Fowler's position will not prevent the movement of fluid to the subphrenic region. Air in the peritoneal cavity would interrupt continuity of the fluid film, but air in the subphrenic spaces increases the suction effect of the diaphragm because of loss of contiguity of the liver. The liver is then suspended by its ligamentous attachments, potential spaces becoming actual, pain results (as is noted in Rubin's test and induction of pneumoperitoneum), excursion of the diaphragm is decreased and decreased pulmonary aeration also occurs; but even so, fluid is sucked into the subphrenic spaces and at operation for perforated ulcer is often demonstrable there, while the lower part of the peritoneal cavity is free from fluid.

After abdominal operations pneumoperitoneum is always present. In addition to the above-mentioned effects, reflex inhibition of respiratory movement is inevitable because of manipulation of abdominal viscera, section of the abdominal wall and pain. Muller *et alii*[5] found that the vital capacity after abdominal operations was only 33% of the pre-operative figure and demonstrated radiologically that the domes of the diaphragm were elevated in all patients. They also showed that air was frequently demonstrable below the dome of the diaphragm, that diaphragmatic excursion was maximal in the recumbent position and that the post-operative radiological appearance of the lungs was comparable to the pre-operative picture during forced expiration.

Personal observation will convince one that, while there is good vital capacity when sitting upright or leaning forward, there is a great reduction when

sitting back, even in a chair, let alone when in the somewhat crouched Fowler's position. Admittedly full Fowler's position with a "donkey" under the thighs (not the knees) is of use in congestive cardiac failure; but the explanation almost certainly lies in the decreased venous pressure in the right atrium (McMichael and Sharpey-Schafer[4]) resultant from this posture and in the increased ability to use the accessory muscles of respiration because of the support given to the arms. There may be some slight advantage in using full Fowler's position when abdominal distension is present; but no one would recommend Fowler's position for a patient suffering from typhoid fever with abdominal distension in order to prevent hypostasis. Hypostasis actually occurs in Fowler's position. Why then use that position as a prophylactic measure against hypostasis after operation?

It has been my practice for many years, in the absence of congestive cardiac failure, to have all patients with pneumonia nursed "flat"; and even in the days before the use of chemotherapy there was no occasion for regret. In the recumbent position the patient can be turned readily from side to side, expectoration is easy, the head is supported on sufficient pillows to facilitate administration of food and fluids, the patient rests more comfortably, sleeps more readily, and is not more distressed. Does anyone ever feel rested after sitting up all night?

Pulmonary Complications: Their Prevention and Management.

To prevent pulmonary complications after operation there is strong evidence in favour of the recumbent position. A clear airway must be ensured during recovery from anæsthesia, and continuous observation until full consciousness has been regained is necessary so that no foreign material will be inhaled. The position of the patient must be altered regularly to assist good aeration of both lungs. Active expectoration must be encouraged, adequate doses of morphine being given to relieve pain; thus one may prevent plugging of bronchi by viscid mucus. "Carriers" of infection must be denied access to the patient. "Carbogen" may be given only when the airway and bronchi are clear of secretions and then in adequate amount nasally or with a "B.L.B." mask.

If pulmonary complications do occur, differentiate between atelectasis which requires drastic postural changes and forced coughing, and pneumonic lesions; make a determined effort to establish a diagnosis; use chemotherapy in adequate doses when indicated; explore whenever an effusion is suspected and, if in doubt as to whether a collection is pleural or subphrenic, replace the collection with some air and reexamine the patient by X-rays. The recumbent position is the best even when complications are present.

Discussion.

No one single factor determines the incidence of pulmonary complications. Sex, age, preexisting infection, the general condition of the patient, sepsis, narcosis, the bronchial content, incorrect use of "Carbogen" when there is material in the bronchi, increased viscidity of bronchial secretion due to the action of atropine, lack of skill on the part of an anæsthetist in giving an anæsthetic by inhalation, the type of operation, the duration of anæsthesia and operation, roughness in manipulation, pneumoperitoneum, displacement of the liver, exposure, shock, tight binders, pain and immobilization of the patient—all may have some effect; but the most important single factor appears to be interference with respiration. In support of this contention there are the following: (i) the experimental work referred to above, which discloses that subphrenic pressure is related to intrapleural pressure and that air under the diaphragm decreases diaphragmatic excursion; (ii) the very important observations of Muller on the raised level of the diaphragm and poor vital capacity after laparotomy; (iii) the radiological appearance of the lungs reported by Muller after laparotomy; (iv) the high incidence of pulmonary complications following operations on the upper part of the abdomen and more especially when peritoneal soiling and pneumoperitoneum have occurred; (v) the effect on respiration of many of the possible factors enumerated above. It is possible that the relatively low incidence of infective pulmonary complications in females is due to the fact that in them normal respiration is predominantly of the thoracic type and that there is therefore less interference with respiration after abdominal operations. This matter warrants investigation.

If respiratory function is impaired, expulsion of bronchial content tends to be defective, atelectasis (lobar or lobular) will more readily occur, and bronchitis can more easily progress to bronchopneumonia.

Much comment has been made above on the importance of posture and on its effect on respiration. When Spalding's paper was published, Layton[3] defended the use of Fowler's position, stressing its great value during the 1914-1918 war; but Ogilvie's recent experience in the campaigns in Northern Africa convinced him of the greater value of recumbency and caused him to write[6] in reply:

> Lives of great men should remind us
> We can make our lives sublime
> Only if we leave behind us
> Crazes that have had their time.

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CHILDBIRTH IN THE ARANDA (CENTRAL AUSTRALIA).

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THE purpose of this paper is to place on record the practice of childbirth by members of the Aranda tribe, living within an eighty-mile radius of Alice Springs. During the year 1946 the writer has personally observed normal and abnormal childbirth in the Aranda and questioned aboriginal women on the subject. These investigations show that, although the mechanics of obstetrical management remain basically unaltered, small variations do occur. These changes are due to contact with the white man bringing about the following: (i) slow detribalization, (ii) a change of environment, (iii) a usage of convenient tools and implements.

Primitive man's material life is influenced not only by his mythology and ceremonies, but also by his resources. As his material sources increase and his own culture recedes through the white man's influence, his actions are stripped of traditional coverings. However, they still retain their practical basis. The original design remains, but the ornamentation is changed by omissions and substitutions. This is well shown in his midwifery.

Conception and Totem.

The Australian aboriginal has been credited with only a mystical idea of conception. Yet subincision of the penis at the same time has been regarded as a method of birth control. However, males of all ages with a subincised penis can procreate. The aboriginal certainly realizes now the procreative function of the union of man and woman. Thus when a lubra was asked why a certain white woman had no children, she replied: "But the white woman has no man." The aboriginal's apparent

ignorance of the complete biological facts is bound up with his mythology. He understands the association of copulation and birth, but he does not recognize that the fœtus is alive until movements of "quickening" appear at the fourth month. Life is supposed to enter from a nearby totemic object. Such an idea is not far removed from the white man's belief that an immortal spirit is mystically incorporated into the living tissues of a newly born human being. There is at least one example of full-blood aboriginal men of the tribe conferring a totemic name on a half-caste child born of a white man; on being asked why they should contradict themselves in doing so when they knew that the paternal ancestor was white, they replied that they realized this, but were merely conforming with tribal and mythological tradition. This would explain the paradox that while a system of totem relationship is still observed there is a knowledge of real physical paternity.

Pregnancy and Labour.

The aborigines have no method of calculating the gestation period. Pregnancy is determined by the movements of "quickening" in the fourth month. In the last month of pregnancy, when the fœtal presenting part sinks into the pelvic cavity ("lightening"), the aboriginal knows that parturition is near. The onset of labour is recognized by strong, painful contractions. The "show" of blood occurring in the early part of the first stage is not observed; however, the significance of the more obvious rupture of the membranes and the escape of the amniotic fluid preceding full dilatation of the cervix and the second stage of labour is realized.

During the first stage of labour the woman and her female attendants (who are usually blood relatives) move away from the main camp to a place further than a baby's crying distance. This ensures that no male or unauthorized person will be present at the birth.

The ground is prepared on a selected spot; the surface soil is scraped away for about a depth of three inches and an area of twelve square feet. A hole about six inches deep is sometimes dug in the ground to receive the baby. (Commonly a blanket is now used to cover the ground, these preliminaries being dispensed with.)

In the second stage of labour the attendants take up their positions. The parturient woman squats on her heels, holding her knees apart. She is supported on the lap of another woman kneeling on the ground behind her. Another female attendant sits a short distance in front. The woman in labour squats low, with thighs and legs apart and her vulva a few inches off the ground and entrusts herself at this stage to the posterior attendant. The latter, while supporting the parturient woman on her lap, places her hands on the sides of the swollen abdomen and strokes it gently between the pains. During the pains she presses firmly on the flanks, and at the height of the pain exerts strong pressure from above downwards on the uterine fundus. The front attendant occasionally assists by pressing on the abdomen, but her role at this stage is passive.

The posterior attendant keeps up the lubra's morale by words of encouragement. She says repeatedly "*Kala*" ("it is all right"), and urges her to bear down. During a normal labour little fuss is made by either the woman (who is most stoical) or her attendants. This procedure continues until the child is expelled through the vaginal outlet.

There is no interference whatever with the mechanism of childbirth. With the onset of pains after complete version and external rotation, the mother is lifted slightly by the posterior attendant and the body of the child is received gently on to the surface of the ground or a shallow hole dug in the earth. Neither assistant touches the child or the vaginal outlet until the head and body are fully born. This "no touch" attitude is strictly observed in normal labour. However, if the umbilical cord is constricting the child's neck, the front attendant slips the cord over the head or shoulder and then sits back again. Leaving the child untouched, all wait passively for it to cry. No measures are taken to hasten this.

The front attendant now plays a more active part. Her function is to care for the child and the afterbirth. Methods of dealing with the umbilical cord vary. It may be severed at this stage or later, when the placenta has been expelled. The cord is severed about six inches from the navel by a "crushing" blow between two stones or by a blunt yam-stick. This seals off the umbilical vessels at the same time, making a ligature unnecessary. (Detribalized natives use a knife to sever the cord; they tie it with a piece of string or fibre after it has been severed.) The baby is left while the delivery of the placenta is attended to. While the placenta is separating itself from the uterus during the third stage of labour there is a short rest. After about fifteen minutes the attendants exhort the lubra to strain and bear down. The lubra herself holds the cord between the first two fingers and thumb of both hands a short distance from the vulva and pulls gently while the other two women press and knead the centre of the abdomen. The lubra draws out the cord with great care, taking up the slack rather than pulling against resistance. This procedure is slow and unhurried. When the placenta is finally withdrawn the lubra lies back and rests.

The front assistant takes up the baby and rubs its skin with soft powdery ash, or washes it if water is available. Sometimes the cord is retained and after being dried it is ringed around the baby's neck as an amulet. The placenta is buried without ceremony.

Abnormal Presentations and Complications of Labour.

The writer's experience of abnormal labour in the Aranda has been confined to the following: (i) breech birth, (ii) retained placenta.

It will be readily understood that primitive nomadic people have no methods of dealing with abnormal labour. The mortality rate in these births is high. When the aftercoming head refuses to be born, the body and limbs of the child are pulled and clawed in panicky efforts to extract it. The writer has been summoned to native camps, only to find the scratched and torn body of a dead child with the head still in the vagina and the attendants and relatives helpless with hysteria.

Inversion of the uterus is common in cases of retained placenta, by virtue of the aboriginal's habit of delivering the placenta by pulling on the cord.

Summary and Conclusions.

1. The practical management of childbirth by the Aranda is described.

2. Modifications of technique and ceremony are associated with detribalization.

3. The aboriginal's knowledge of obstetrics is limited to normal labour. The maternal and fœtal mortality rates in abnormal labour would appear to be high.

Reviews.

NUTRITIONAL AND VITAMIN THERAPY.

So many advances have been made in vitamin therapy in the past decade that it is necessary for most doctors to have a textbook on the subject, and such a book is found in "Nutritional and Vitamin Therapy in General Practice" by Edgar S. Gordon, which now appears in its third edition.[1] The history of the discovery of the various vitamins is traced and the natural sources from foodstuffs are listed as well as complete details of their chemical formulæ and of their synthesis where this has been accomplished. As would be expected in a book published in the United States, where pellagra is an endemic disease, the author devotes an interesting chapter to this subject and he separates the other factors in the vitamin *B* complex

[1] "Nutritional and Vitamin Therapy in General Practice", by Edgar S. Gordon, M.D., Ph.D.; Third Edition; 1947. Chicago: The Year Book Publishers, Incorporated. 8" x 5¼", pp. 410, with illustrations, some of them coloured. Price: $5.00.

from nicotinic acid in describing the symptoms occasioned by their lack.

A little over half of the book is devoted to the vitamins and the rest to chapters embracing all phases of nutrition. Due attention is paid to the economic factors in diet deficiencies and also to the value of the "protective" foods about which much was learnt during the recent years of war. The problem of dental caries and its prevention by dietetic means is fully dealt with and a complete chapter is written on methods of weight control. This book can be recommended as a most useful guide for all doctors whose practice touches the many problems associated with diet and health.

ANÆMIA AND FOLIC ACID.

THE study of hæmatopoiesis has been intensified in the last ten years. In the last two years a group of substances have been shown to be associated with hæmatopoietic mechanisms—xanthopterin, thymine, pteroyl-glutamic acid, pteroyl-triglutamic acid, -hexaglutamic acid and -hepta-glutamic acid. Of these pteroyl-glutamic acid (folic acid) is best known and has been responsible for the most dramatic clinical instances of recovery from anæmia of nutritional origin. The clinical work in this field has been carried out mainly by a group of workers at the Hillman Hospital, Birmingham, Alabama, under Professor T. D. Spies, who has written a slim volume entitled "Experiences with Folic Acid".[1]

The book contains the conclusions from the work published over a period of some years. It is very useful to have the essential material of a large number of papers suitably arranged in one volume. A number of these have been reviewed in this journal as subjects for "Current Comment". The detailed account of the organization of the work should be of great use to prospective clinical research workers. The subject is discussed under three headings: "Selection of Subjects and Methods of Study", "Response to Folic Acid", "Folic Acid Therapy". The last section, coming from such an experienced worker, is particularly valuable. Overall the book is a summary of the clinical study of 218 patients classified in the following groups according to their maladies: Addisonian pernicious anæmia, tropical sprue, non-tropical sprue, nutritional macrocytic anæmia (pellagra), macrocytic anæmia of pregnancy, nutritional leucopenia and cirrhosis of the liver. Except in the last, the response to folic acid injection was satisfactory. Dr. Spies summarizes present views on the status of the nutritional anæmias and points out that these are still fresh and fertile fields of study dealing with the neural changes involved, as these are not affected by folic acid.

The volume is very well produced. The printing and materials are excellent.

THE PRACTICE OF MEDICINE.

HYMAN has presented a great amount of useful information in his four volumes of "An Integrated Practice of Medicine".[2] The first volume deals with the general reaction of the systems to disease, with infectious disease, allergy, metabolic disorders and diseases of the circulatory system. The second gives an informative picture of diseases of the blood, psychiatry, and the digestive system.

Difficulties in the preparation and printing of such a work are so great that it is all the more extraordinary to find the information so up to the minute; one of the objections to such a work is usually the argument that by the time it is printed a good deal of the information is already out of date. As time passes, advances will occur, but in spite of these changes the basic principles will remain and this work should for a long time remain an important and useful source of reference.

Throughout the volumes there are many tables of differential diagnoses and summaries for comparison which are so well set out that they make rapid reference simple. It is gratifying to see the statement that the symptoms of blood pressure, apart from terminal symptoms, occur only when the patient is informed of the presence of high blood pressure. There is no doubt that these symptoms are usually part of an anxiety state in the nature of an iatrogenic disease.

The section on psychiatry is useful, especially in the manner in which the authors point out that a good deal of psychiatric treatment should be carried out by the physician or general practitioner prior to the employment of what the authors term "formal psychotherapy". The dangers of sulphonamide therapy are adequately stressed. The information on infectious diseases is clear and concise and for a volume of this type the subject of allergy is adequately described. Similar remarks could be applied to those sections dealing with the medical aspects of disease in general.

One or two errors were noted, such as hyperinsulinism in lieu of hypoinsulinism on page 700 and a wrong caption on one of the oblique radiological heart views on page 798.

From the point of view of the physician and general practitioner it would be very difficult to compile a more up-to-date and easily accessible source of information, although in some instances the specialist physician needs a more detailed account of disease.

The value of the index is increased by the fact that it is divided into three sections, the first an index of illustrations, the second an index of differential diagnosis, and thirdly the classification under a general index.

The surgical aspect is not dealt with very extensively in this work, as it is evidently not intended to be a work covering the subject of major or specialist surgery. In the field of general surgery there is a section in Volume IV which deals with minor surgery, but the specialist surgeon will find little of value in this publication. There are sections covering the diseases of the urinary tract, the reproductive system and the skeletal locomotor systems, and one of the chief virtues of these sections is the clear injunctions given to the practitioner to seek specialist advice.

The female reproductive system is dealt with in the space of 140 pages, and this includes a discussion of the appropriate physiology, methods of diagnosis and endocrinology. Breast conditions are included in this section and appear to be dealt with in inadequate fashion, and it seems that the very nature of this work will limit its usefulness because important subjects must of necessity be limited in depth of treatment. On the other hand it is remarkable how much of the real essentials are covered when an analysis is made of the actual subject matter of many sections. The discussion on hernia is dealt with in a matter of less than five pages, and one of these pages is taken up largely by illustrations of trusses and another by a table of the differential diagnosis of inguinal swellings and tumours. This serves to illustrate the surgical scope of these volumes.

The individual volumes are of useful dimensions and the general production is good. Headings of sections and subsections are clear and much use is made of tabular methods, especially in regard to the problems of differential diagnosis. Many good reproductions of X-ray films are made, especially in the section on the urinary tract, and the majority of the small coloured plates are clear and striking representations of the various pathological states depicted.

The radiological reproductions in the section on fractures are less impressive. A very useful tabulation is presented on "The Management of the Patient with Fracture". One column is headed "Do" and the opposite column "Don't", and the latter column is simply packed with wise counsel. In fact throughout the sections on surgical subjects, much clear-cut advice is given considering the limited scope attempted. At times, however, one is disappointed, as in the section on the management of paraplegia accompanying fractures of the spine, and no help is forthcoming on the vital subject of the management of the bladder except as follows: "Retention of urine and distension of the bladder are particularly to be avoided."

The subject of obstetrics is dealt with in just over one hundred pages and the text is interspersed with many illustrations. Strips from the motion picture of the forceps operation by De Lee are reproduced, but the general effect is not one of clarity. One subject is dealt with fully, and that is the caudal method of anæsthesia, and a comparatively full account is given of anatomical and technical details involved in this procedure.

The surgical portions of these volumes can be seen to be limited in scope and are not exhaustive surgical works, but rather succinct and sound sections integrating well with the general medical plan for the management of disease in a matter quite in keeping with the title of the work.

[1] "Experiences with Folic Acid", by Tom D. Spies, M.D.; 1947. Chicago: The Year Book Publishers, Incorporated. 9" x 6", pp. 112, with many illustrations, some of them coloured. Price: $3.75.

[2] "An Integrated Practice of Medicine: A Complete General Practice of Medicine from Differential Diagnosis by Presenting Symptoms to Specific Management of the Patient", by Harold Thomas Hyman, M.D.; 1946. Philadelphia and London: W. B. Saunders, Company; Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¾" x 6". In four volumes and index. Volume I, pp. 1123; Volume II, pp. 1034; Volume III, pp. 1144; Volume IV, pp. 1094; Index, pp. 208. All volumes contain many illustrations, some of them coloured. Price: 375s.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 27, 1947.

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FOOD AND POPULATION.

IT was the opinion of the late H. G. Wells that no more "shattering" book had ever appeared than the "Essay on the Principle of Population" by the Reverend Thomas Robert Malthus published in 1798, the same year, by the way, in which Jenner gave vaccination to the world. It was certainly shattering to those who held a complacent and superficial optimism regarding human welfare. "Whatever is, is right", "the best of possible worlds", were aphorisms made by the comfortably off, addressed to the comfortably off and accepted as verities by the comfortably off. The plausible doctrines of Rousseau, Condorcet and Godwin regarding the perfectibility of society had already received blow after blow from the excesses of the French Revolution; they now got their *coup de grâce*. After the first shock of surprise was over the inevitable reactions began; there were those who denied point blank that population could outgrow the means of subsistence; there were, of course, those who asserted that everything which Malthus had proclaimed had already been uttered by others just as well or even better. It is true that Malthus made amplifications and qualifications as each new edition appeared, the final one being in 1816, for he resembled Darwin (to whom indeed he had given the idea of the struggle for existence and so the germ of "natural selection") in candour, philosophical temper and patience. Even today criticism of Malthus is not always just or discriminating. His proposition that "population increases in a geometrical, food in an arithmetical progression", cannot be accepted as strictly accurate and may be cited as another instance of the mathematician coming to grief in matters involving human affairs, and Malthus was a mathematician, ninth wrangler and a Fellow of Jesus College, Cambridge. Napoleon made the distinguished mathematician Laplace a Minister of the Interior, but had to remove him from office because "he applied the infinitesimal calculus to human actions". Though Malthus may have erred in the same way, he was not just as foolish as some of his critics have imagined. An unsympathetic, and unsigned, notice in the *Encyclopædia Britannica* says of this formula: "This proposition, however, has been conclusively shown to be erroneous, there being no such difference of law between the increase of man and that of the organic beings which form his food." It should surely have been evident to the writer that with terrestrially produced human food the larger part is debarred from reproduction, and further that unless there is an enrichment of the soil an increase of the product necessitates extension of the acreage employed. Every textbook of economics devotes some space to this reaction between food and population and the subject comes up repeatedly in many publications, but nothing like unanimity in the authors has been apparent. Some exponents of the "dismal science" regard the law of diminishing returns from land as the chief factor in producing undernutrition; others deny flatly that population tends to outgrow food supply; they maintain that food tends to outgrow population. Some twelve years ago, that is, before the last war, Dean Inge announced his conviction that population was pressing heavily on the means of subsistence; Professor J. B. S. Haldane took exactly the opposite view, namely, that there was more food being produced than humanity could eat! Many critics of Malthus today support the doctrine that population and food automatically adjust themselves, though admittedly with some lag in the controlling reaction, what the physicist would call hysteresis and the engineer "hunting of the regulator". When food increases in amount they assume that there will be a spontaneous rise of population; when food decreases in amount there will be, after an unfortunate lag, an automatic decline in population. This law requires a little doctoring to make it fit the very obvious fact that with the wealthier members of the community the greater the means the lower the birth rate. Statistical methods have developed to such a degree that a liberal training in the higher mathematics is necessary for research, exposition and comprehension, but even with this intellectual weapon of precision finality is far from being achieved. A recent analysis[1] has shown that mortality figures have widely different significance according to the distribution of deaths over the pre-reproductive and mid-reproductive (and in the human with the post-reproductive) periods.[2]

Malthus put war in a high place amongst the checks to population, and no doubt this was the case amongst primitive peoples, but losses in war have always been lower than losses from disease unconnected with war. In the last great conflict and in its present aftermath we see something never envisaged by Malthus and succeeding economists, namely, that war can reduce food production and dislocate food distribution to a far greater extent than it can reduce population. Australians, accustomed to see fruit rotting on orchard soil, wheat stacks infested with mice or weevil, and sea fishermen ordered to limit their catch, feel a little bewildered and are inclined to attribute to faulty distribution much of the food scarcity of today;

[1] M. E. Solomon: "Mortality Required to Prevent Population Increase", *Nature*, June 21, 1947, page 848.

[2] It is stated in the *Eugenics Review*, 1947, that a new demographic quarterly, *Population Studies*, is being published by the Cambridge University Press under the editorship of Dr. D. V. Glass. This journal will probably appeal to those who are interested in the question of food and population.

still one contention of Malthus seems unassailable, and that is an expected growth of world population for which the food supply is not in view. The Population Reference Bureau of Washington estimates that twenty million more people are being added to the human race every single year. In India one out of every four babies is said to die in the first two years of life; should the birth rate remain the same—admittedly a pure postulate—and medical science save most of these babies, then within a hundred years India would contain five times the earth's present total of human beings. Unless the unexpected happens and Australian immigration enters on a new and massive phase, this country may look forward to being a food exporter for a fair number of years to come; still a long-range view is necessary for us as well as for the densely populated countries, and a survey should be made of the possibilities of increased food production throughout the world. In the front rank perhaps should be placed a greater exploitation of the products of sea, lake and river. Despite our boasted advances in civilization, we are still in the nomadic age as regards fish capture. Actually there was more attention to pisciculture in the Middle Ages than today. The dramatic results of the Scotch experiments when sea inlets were enriched with phosphate and nitrate and the success of the American farmer with his phosphated fish pond indicate what might be done in Australia. Whether Australian sea inlets lend themselves to a repetition of the Scotch experiments a properly conducted survey should reveal, but there is no escaping the fact that the fish population of Australian rivers and lakes is low in comparison with that of other countries, and here a liberal phosphating ought to be attempted.

Increased yield from land already under cultivation or on the fringe of cultivation can be effected by reinforcing certain substances present in low concentration; not only such obvious additions as water, phosphate, lime, potash, nitrate and the like, but also those trace elements which recent research has shown to play an important role in the life of plant and animal.

The greatest possibilities, however, lie in the exploitation of the tropics. Those who visit tropical territories for the first time are surprised that by far the greater portion of the soil is given over to jungle. Even Ceylon and Java with heavy populations have great tracts of jungle where wild creatures live and breed unmolested by man. Owing to the high rainfall leaching so much of the mineral matter, plant life in the tropics is characterized by a preponderance of carbohydrates and oils which come exclusively from the carbon dioxide and water of the atmosphere; but, as was shown by Harvey Sutton, a human being in a tropical environment has a higher respiratory quotient pointing to the greater use of carbohydrate in metabolism, the carbohydrate of rice, sago, tapioca and sugar cane. So far only a small fringe of tropic lands is cultivated, mostly coastal, whilst the vast jungle lies behind with its riotous life of little use for human needs. Yet in the tropics there is a far greater reward for human labour than in the extra-tropics if only human health could be maintained. Australia has jungle to be reclaimed and also ample areas with high insolation are awaiting the advent of water supplied by modern engineering. The physiological disabilities of the tropics are few, and the indications are that most of these can be obviated by improved methods of air conditioning. When we regard disease in tropical lands, we encounter a problem of the first magnitude. Whether this disease will be mastered by prophylactic and remedial treatment or by the eradication of insect vectors, the future, and it may not be so far off as some imagine, will show. Should civilization once more enter the tropics from which it was expelled or towards which it ceased to be attracted, then a major episode in human history will be consummated. Indeed one might aver that it would dwarf the atomic bomb in the immensity of its effects on the future of humanity. Australia is here in a most fortunate position on account of the sparse distribution of tropical diseases and the absence of a large native population acting as a reservoir of endemic infections and contagions; so we may expect with some confidence that long before tropical Asia, Africa and America are rendered fit for agricultural exploitation, Australia may enter on a new phase of food production with its strong possibility of greatly increased population.

Current Comment.

THE MURINE TYPE OF TUBERCLE BACILLUS.

THE publication by A. Q. Wells, in 1937,[1] of his original observations on an epizootic disease due to infection with an acid-fast bacillus, affecting wild voles, or field mice, notably the species *Microtus agrestis*, was an event which subsequent researches have shown to have been of major importance. The mycobacterium in question became known as the vole acid-fast bacillus, but in a monograph dated July 21, 1946, published Number 259 in the Special Report Series of the Medical Research Council of the Privy Council of Great Britain, and entitled "The Murine Type of Tubercle Bacillus", Wells adduces convincing evidence that his vole acid-fast bacillus is indeed a genuine tubercle bacillus.[2]

Unlike the bacillus of rat leprosy the vole bacillus is susceptible of cultivation, being generally dysgonic on artificial media and intolerant of glycerin; in these respects it resembles the bovine type of *Mycobacterium tuberculosis*. When administered in sufficiently large doses it induces progressive disease in the guinea-pig, and the "Notes on the Morphology of Infection by the Vole Acid-Fast Bacillus" with which A. H. T. Robb-Smith supplements Wells's monograph, show that the pathological processes in voles follow the pattern of tuberculosis. The vole bacillus forms a tuberculin in liquid media which is very closely allied to mammalian "old tuberculin", and Wells has established by absorption of agglutinin tests the very significant fact that the vole acid-fast bacillus is indistinguishable antigenically from the human and bovine types of *Mycobacterium tuberculosis*. Of mammalian tubercle bacilli there are now to be recognized three types, human, bovine and murine, the third member of the triumvirate having been so named, most appropriately, by Wells himself.

The low degree of virulence displayed by the murine type of *Mycobacterium tuberculosis* for laboratory animals, its antigenic identity with the human and bovine types, and its capacity to induce sensitivity to tuberculin prepared from human and bovine strains of *Mycobacterium tuberculosis*, evoked a quick response from a number of workers to the suggestion of the probable

[1] *The Lancet*, 1937, Volume I, page 1221.

[2] "The Murine Type of Tubercle Bacillus: 'The Vole Acid-Fast Bacillus'", by A. Q. Wells, with "Notes on the Morphology of Infection by the Vole Acid-Fast Bacillus", by A. H. T. Robb-Smith; 1946. Medical Research Council of the Privy Council, Special Report Series Number 259. London: His Majesty's Stationery Office. 9½" × 6", pp. 56, with many illustrations. Price: 2s.

utility of the murine type of *Mycobacterium tuberculosis* as an immunizing agent, vaccination with which might be expected to result in enhanced resistance against infection by human and bovine types. Here in effect was a ready made "B.C.G.", with the necessity for attenuation by tedious years of subculture eliminated.

The possibility that a passing infection with the murine type of *Mycobacterium tuberculosis* might favourably influence the course of subsequent infection with human and bovine types of tubercle bacilli was early investigated by Wells and Brooke.[1] The experiments were perforce discontinued on the outbreak of war, and although Wells and Brooke regarded them as inconclusive, and claimed no statistical validity for the findings, their results attracted attention as highly suggestive. When the guinea-pigs were killed eleven weeks after infection with virulent tubercle bacilli, those animals which had received immunizing injections of murine bacilli showed notably less tuberculous disease than the controls, or those which had received "B.C.G.".

Konrad Birkhaug, in Norway, was among those sufficiently impressed by the results of the interrupted experiments of Wells and Brooke to be anxious to repeat the observations and allow the experiments to run the full course planned by their originators.[2] By a commendable subterfuge Birkhaug circumvented the churlish refusal of the military authorities of the German occupation to permit the passage of a request to Oxford for cultures of the vole bacillus. He found that the animals vaccinated with vole bacilli and with "B.C.G." showed a greatly increased survival time as compared with controls, but that there was no statistically significant difference between the survival times of the two groups of vaccinated animals. All the animals, both vaccinated and controls, eventually died from generalized tuberculosis.

The general tenor of published work on this subject is that no solid immunity to tuberculosis is induced in guinea-pigs by vaccination either with the vole bacillus or "B.C.G.". The effect of vaccination is a delay, often very pronounced, in the development of generalized disease after artificial infection. In this connexion the negligible natural resistance of the guinea-pig to tuberculous infection suggests that it is an inferior animal for the conduct of immunity experiments in tuberculosis, and that a better immune response might be elicited in vaccination of human beings, in whom natural resistance, or that acquired as a result of infection, is fortunately in the majority of instances sufficient to deal with all ordinary exposure to risk.

Immunization experiments in 121 human volunteers were instituted by Wells with the object of determining the safety of the vole tubercle bacillus as a vaccine, the nature of the reaction and the possible modifications in local reaction attending subcutaneous, intracutaneous, and multiple puncture inoculation. The vaccine was prepared from a 14 to 21 day culture of the vole bacillus on Dorset's egg medium, and it was required of every recipient that he should exhibit no reaction to the intradermal injection of 0·1 millilitre of a one in 100 dilution of old tuberculin. The safety of the procedure was established; local reaction culminated in subcutaneous abscesses and cutaneous ulcers with undesirable frequency when the vaccine was administered by subcutaneous or intradermal injection, but was benign, harmless, and in no sense disabling or disfiguring in all of the 60 persons vaccinated by the technique of multiple skin puncture. In this, the method of choice, the local reaction assumed the form of small, raised, red papules, which remained visible for one to three months, after which time interval there could be felt small, shotty thickenings of the skin where the papules had formerly been located. None of the subjects exhibited any general reaction or palpable enlargement of the regional lymphatic glands.

Irrespective of the technique followed in vaccination, all the volunteers were rendered tuberculin sensitive. The significance of tuberculin sensitivity as an index of immunity is a very contentious question, and Wells states explicitly that no conclusion whatever is to be drawn from these experiments regarding the induction of resistance to tuberculosis by vole bacillus vaccination. It does appear, however, that a vaccine consisting of the murine type of *Mycobacterium tuberculosis* in artificial culture will soon enter the field as a rival of "B.C.G.", possessed of the two advantages of ease of preparation and insusceptibility to deterioration. As regards safety, local reaction, tuberculin test conversion rate, and degree of induced resistance as observed in animal experiments, there would seem to be nothing to choose between vole bacillus vaccine and "B.C.G.". The difficulties involved in a large-scale, critical, human experiment in tuberculosis vaccination, particularly that of ensuring rigidly comparable conditions in the vaccinated and control groups with respect to general health and hygiene, nutrition, mode of life and exposure to tuberculous infection, seem to be well nigh insuperable, but will probably not deter the sponsors of the vole bacillus from making the attempt.

[1] *The British Journal of Experimental Pathology*, Volume XXI, 1940, page 104.

[2] *American Review of Tuberculosis*, Volume LIII, 1946, page 411.

PSORIASIS AND VITAMIN A.

PSORIASIS, which can be a most distressing condition, is relatively common and much thought and ingenuity have been expended on its management. So far, however, its exact nature has remained obscure and its treatment is mostly unsatisfactory. One factor in its nature which has been appreciated is the failure in the mechanism of keratinization when increased demands on the protective and reparative processes occur. Accepted therapeutic agents, such as careful sun treatment, local application of tar, sulphur and chrysarobin, and internal administration of inorganic arsenic compounds, while they probably exert a beneficial effect for various reasons, have in common a distinct keratoplastic effect. In view of the keratoplasia observed in vitamin *A* deficiency states, a group of Boston workers, Richard Hoffmann, Evelyn J. Lorenzen and Arlene S. Garfinkel, studied the effect of a diet low in vitamin *A* on a group of eleven subjects of well-established psoriasis.[1] Only patients who had had extensive psoriasis of long duration without spontaneous remissions were studied. A maximal daily intake of 150 to 300 international units of vitamin *A* was allowed. Care was taken to ensure that other essential food elements were included in adequate amounts. No local treatment except white "Vaseline" was used. Clinical observations, careful recording of diets and periodic skin biopsy were all carried out, and in the later stages plasma carotene and vitamin *A* levels were determined at intervals. In nine of the eleven subjects the psoriatic lesions markedly decreased or completely cleared within eight to forty weeks after the initiation of the restricted diet. The first definite sign of improvement appeared within four to twelve weeks. Six of the patients who had responded favourably to the restricted diet suffered relapse within three to eight weeks after resumption of a normal diet, and one patient suffered relapse six weeks after his diet had been supplemented with carotene. One patient, who at first responded favourably, later suffered relapse and other untoward effects while still taking the restricted diet. Observation of plasma levels has revealed the interesting fact that the carotene levels dropped rapidly after institution of the restricted diet, but the vitamin *A* levels were unchanged. This phenomenon is discussed by the authors, but its significance is not fully understood. Moreover, no conclusion was reached as to whether or not stimulation of keratinization due to vitamin *A* restriction was the basis for the observed improvement. However, improvement did occur and, although the authors feel that the dietary restriction cannot be considered a practical therapeutic régime, the results are encouraging; they may well lead to an understanding of this baffling affliction and to an effective means of treatment.

[1] *The New England Journal of Medicine*, June 19, 1947.

Abstracts from Medical Literature.

PATHOLOGY.

Effects of Radioactive Phosphorus (P^{32}) on Normal Tissues.

ACCORDING to William R. Platt (*Archives of Pathology*, January, 1947) the β emanations of radioactive phosphorus (P^{32}) produce characteristic changes in many body tissues, alterations which vary in intensity, but are similar to those produced by other types of radiation. The lesions observed are the resultant of several diverse cellular, intercellular and vascular changes. Prominent specific features are varying degrees of cellular death, abnormal mitoses producing giant irregular nuclei, fibrosis, hyalinization of collagen and a vascular alternation characterized by thickening and hyalinization of small blood vessels. There is selective localization of large quantities of radioactive phosphorus and greater injury in the tissues most often involved by the neoplastic cells of malignant lymphomatoses and myelomatoses, that is, marrow, liver, spleen and lymph nodes. Changes were also demonstrated in lungs, kidneys, gastro-intestinal tract, ovaries and testes.

The Fate of Carcinoma Emboli in the Lung.

A STUDY of twelve lungs in which carcinoma emboli were encountered on routine histological examination was made by Otto Saphir (*The American Journal of Pathology*, March, 1947). These emboli were found in the smaller and smallest branches of the pulmonary artery, in capillaries, and in small pulmonary veins. A small sheath of fibrin and hyaline thrombi almost invariably were encountered adjacent to the tumour cells. The thrombi seemingly caused atrophy of adjacent tumour cells which were gradually replaced by the growing thrombi. Eventually these thrombi became organized, but clumps of tumour cells were still recognizable either within the new channels or embedded within the growing connective tissue. Thus, not the tumour emboli but the hyaline thrombus became organized and caused the disappearance of the tumour cells. When only mural thrombi were encountered, the eventual organization caused localized intimal thickening which very closely resembled pulmonary arteriosclerosis.

The Permeability of the Renal Glomeruli of Several Mammalian Species to Labelled Proteins.

WHILE studying the origin of colloid droplets in urodeles, Hans Smetana (*The American Journal of Pathology*, March, 1947) found that intravenous injection of proteins labelled with diazotized dyes was followed by the appearance of tiny granules, coloured by these dyes, in the lining cells of the convoluted tubules of both the "closed" and "open" nephrons. Because of this unanticipated finding, a systematic study was made to investigate the permeability of the renal glomerular filter of several mammalian species to labelled proteins. The various proteins to be used were coupled with the disodium salt of 2-naphtol-3 : 6 disulphonic acid (R salt). Preparations of egg albumen, and of serum albumin and serum globulin of heterologous and homologous species, labelled by R salt, pass the glomerular filter of normal mice, rats and dogs after intravenous injection; particles of these substances are reabsorbed by the lining cells of the proximal convoluted tubules after passage through the glomerular filter and are stored in these cells in the form of tiny granules. The number of granules present in the lining cells of the tubules is roughly proportional to the amounts of protein-dye compounds administered. The particles of protein-dye compound remain in the lining cells of the tubules until these cells are desquamated.

Intralobular Regeneration of Liver Cells in Man.

As opposed to nodular regeneration in the human liver following extensive necrosis and in cirrhosis, focal or diffuse intralobular hyperplasia is a very common finding in autopsy material, according to C. T. Ashworth (*The American Journal of Pathology*, March, 1947). In a series of 100 cases this type of regeneration was found in 63%. The prominent characteristics of this process consist of hypertrophy and hyperchromatism of nuclei, increased numbers of binucleate liver cells, and increased amount of cytoplasm. The lesions in the liver commonly found to be associated with regeneration of this type were chronic passive hyperæmia, fatty infiltration, and senile and malnutritional atrophy. Regeneration was found also in marked degree in connexion with eclampsia and in a group of elderly patients without other apparent causes. In this latter group some of the most advanced degrees of intralobular regeneration were encountered. Although mitotic figures were not observed in these regenerating areas of liver tissue, there was evidence of polyploidy, a phenomenon of karyokinesis occurring in binucleate cells. Thus, the increase of nuclear volume in the regenerating cells as compared to normal cell nuclei approached two to one or four to one. It appears that in spite of the occurrence of advanced degrees of intralobular liver regeneration in many of these cases, no evidence of impaired function of the liver presents itself. Nor is there any suggestion that the lesion may proceed to the nodular type of regeneration characteristic of cirrhosis. On the other hand, the phenomenon is considered to be an expression of continuous and active cell replacement in the liver, which is speeded up in instances in which there is excessive intralobular cell loss, and which is characterized morphologically by the occurrence of polyploid nuclei and increased numbers of binucleate cells.

Visceral Kaposi's Disease.

THE literature on Kaposi's disease is reviewed and analysed by C. G. Tedeschi, H. F. Folsom and T. J. Carnicelli (*Archives of Pathology*, April, 1947) with special reference to the visceral manifestations. From the study of two cases in which the liver, the kidney and the small bowel showed multiple independent growths and of a third case with mediastinal localization, all the growths consisting of newly formed blood channels and including proliferations of endothelial and adventitial connective tissue cells, of phagocytic histiocytes, of fibroblasts, of lymphoid elements, of a well-organized reticulum and, in one case, of immature hæmatic cells, the conclusion is reached that the patterns of the visceral lesions in these cases were identical with those of the cutaneous lesions of Kaposi's disease. The conception is advanced that Kaposi's disease is systemic in nature and likely to involve independently and in an unpredictable manner, simultaneously or successively, the skin and the internal organs, and that it is characterized from the histological standpoint by a great variety of patterns inherent to the multiple developmental potentialities of the basic unit of growth, the reticulum cell.

Effects of Podophyllin and of Colchicine on Normal Skin, on Condyloma Acuminatum and on Verruca Vulgaris.

ACCORDING to Lester S. King and Maurice Sullivan (*Archives of Pathology*, April, 1947), podophyllin and colchicine when topically applied to squamous epithelium cause profound morphological disturbances. The most characteristic change is the production of enlarged, swollen cells with finely reticulated, palely basophilic cytoplasm and dispersed chromatin material which shows some type of chromosomal arrangement. Other changes, more frequently seen, such as eosinophilic cells with pyknotic nuclei, various forms of cytoplasmic vacuolation and nuclear alterations, are described in detail, but are not claimed to be specific. These are considered as primarily degenerative in character, reflections of the impairment of cellular metabolism produced by the immediate action of the drug. These pathological conditions are seen in normal skin and in *condyloma acuminatum* when treated with podophyllin or with colchicine. The regression of the condyloma is in general correlated with the morphological changes described. The drugs are inactive when applied to a highly keratinized structure such as *verruca vulgaris*.

Lesions following the Use of "Erton" in Rheumatoid Arthritis.

ACCORDING to Margaret Bevans and Henry K. Taylor (*The American Journal of Pathology*, May, 1947), unsupervised use of "Erton" (a vitamin D preparation) in a patient suffering from rheumatoid arthritis led to hypercalcæmia, and calcium deposition in the periarticular and subcutaneous tissues, lungs, heart and kidneys. There were chronic and acute granulomatous lesions in the lungs, the pancreas, the kidneys and the lymph nodes, the nature of which was obscure. It is suggested that these lesions also are related to the use of "Erton". Extensive damage to the renal tubules formed an anatomical basis for clinical renal insufficiency.

So-Called Pulmonary Adenomatosis and "Alveolar Cell Tumours".

A CASE of histologically benign pulmonary adenomatosis without metastases is reported by Morris A. Simon (*The American Journal of Pathology*, May, 1947). This condition is similar to the epizootic disease of sheep. In occasional cases of jaagsiekte and of pulmonary adenomatosis metastasis has occurred. Cytologically, the cases of so-called pulmonary adenomatosis appear to be identical with a much

larger series of collected and reported conditions which have been termed "alveolar cell" tumours, about half of which metastasize. Pulmonary adenomatosis and alveolar cell tumours may be regarded as unusual forms of pulmonary carcinoma presumably arising from alveolar lining cells.

MORPHOLOGY.

Number of Cells in Enteric Plexuses.

M. E. SAUER AND C. T. RUMBLE (*The Anatomical Record*, December, 1946) record counts of the nerve cells in the myenteric and submucous plexuses in representative sections of the small intestines of five cats from mid-duodenum to the end of the ileum. There are over five million myenteric cells in the small intestine of the cat, and from two to three times this number of submucous cells. It is concluded that, with the possible exception of the proximal duodenum, which was not included in this study, the distribution of cells is fairly uniform in each plexus, with no evidence of a gradient within the small intestine.

An Anomalous Peritoneal Sac.

J. L. WIERDA (*The Anatomical Record*, March, 1947) describes a case in which the jejunum, ileum and transverse colon with their respective mesenteries were enclosed within an anomalous peritoneal fold which arose from the anterior surface of the pancreas and was fused with the posterior abdominal wall to form a sac. The sac resembles in general those described by previous authors, and most frequently interpreted as resulting from a hernia into one of the paraduodenal fossæ. This specimen possessed features which clearly separate it from the category of a hernia. It is postulated that this sac had its origin from the dorsal mesentery of the stomach.

Tibial Tuberosity.

E. S. HUGHES AND S. SUNDERLAND (*The Anatomical Record*, December, 1946) describe the tibial tuberosity and direct attention to the presence of a groove that delineates the tuberosity proximally and, in part, laterally. The strongest part of the insertion of the *ligamentum patellæ* is into this groove. In addition, tendon fibres are attached weakly to the upper smooth part of the tuberosity below the groove and, more distally, firmly to the superior margin and inferior angles, especially the lateral, of the roughened area and also, though much less firmly, to the remainder of this area. The relations of the epiphyseal line to the tuberosity and of the tendon to the epiphysis in the young bone have been described.

Mitotic Rate in Liver.

J. W. WILSON AND E. H. LEDUC (*The Anatomical Record*, April, 1947) present the results of experiments performed in an attempt to stimulate mitosis in the liver of a mouse. Mitotic figures are so rare in the liver of the adult mammal that they are usually said to be absent. Although one cell in 10,000 to 20,000 may be actively dividing at any one time, nevertheless under certain conditions liver tissue is capable of very rapid growth by active mitosis. This occurs after some injuries, for example, necrosis following chloroform poisoning, or in regeneration after removal of part of the organ. The authors state that the problem presented by this initiation of mitotic activity in a quiescent organ is a particular case of the much larger and more general problem of the cessation of growth in the organism or its tissues and its resumption at the time of need. In the present investigation it was found that the rate of mitosis in the livers of young mice is at first inhibited, then stimulated, by the intraperitoneal injection of pulped liver of the mouse and of the guinea-pig. Boiled and autolyzed liver, pulped kidney and boiled egg yolk were also effective. The inhibition lasts through the second or third day. The increase reaches a peak from the fifth to the eighth day and then subsides. There is considerable variability in the results. In similar experiments with adult mice in which there is no mitosis in the liver, a wave of mitosis of varying but usually small magnitude and duration occurs from the fifth to eighth day. These results are discussed in the light of the experience of other investigators who have obtained stimulation of mitosis in the liver, and of the explanations they have proposed. We have as yet no satisfactory explanation of the mechanism by which our results are produced.

Inguinal Canal in Primates.

R. A. MILLER (*The American Journal of Anatomy*, January, 1947) describes the structure of the inguinal canal in a series of fourteen representative primate species of various ages and both sexes. A general pattern of the inguinal canal is apparent in all species, which has little relation to bodily form or locomotor habits. The tendency to hold the trunk erect, as in catarrhines, involves alterations in the fundamental pattern, manifest principally in the conformation of the subcutaneous opening of the canal. Its inferior crus acquires a pubic attachment beneath the cord; the insertion of the conjoined tendon reaches the pubis behind the superior crus. A true inguinal ligament, however, is not found in any primate except man. In all the other forms studied, regardless of their postural tendencies, the aponeuroses of the abdominal muscles form a series of arches over the femoral structures to cover the great space between the crest of the ileum and the pubis. A comparison of the inguinal region of man with that of the other primates emphasizes the fundamental differences in length and direction of the canal and in its muscular support. There is a greater difference between man and the anthropoids than between the anthropoids and the lower primates.

Costomediastinal Border of Left Pleura.

R. T. WOODBURNE (*The Anatomical Record*, February, 1947) states that the left costomediastinal pleural border has the following mean relationships. It diverges from its fellow of the right side at the level of the fourth cartilage, lies substernally 0·6 centimetre medial to the left sternal margin at the level of the fourth intercostal space, emerges from the cover of the sternum in the upper third of the fifth intercostal space and moves only 0·2 centimetre lateral to the sternum in the mid-region of this space. Measured from the sternal end of the sixth intercostal space it lies 1·1 centimetres lateral to the sternal margin, which measurement is a location under the sixth costal cartilage due to the considerable slope of this cartilage. The curve defined by these points passes the lower border of the sixth costal cartilage 1·5 centimetres from the sternal end of that intercostal space measured along the sloping lower border of the cartilage. The variability of the pleural margin is considerable. The total range of location of the various points for all cases is 5·0 centimetres at the fifth and sixth intercostal spaces and slightly less at the fourth. It is possible that somewhat less variability occurs among essentially normal living individuals. The investigation provides a broad and more precise view of the intrathoracic topography in the precordial area.

Histochemical Distribution of Gold after Administration of Gold Chloride.

HERBERT ELFTMAN *et alii* (*The Anatomical Record*, December, 1946) record results of a histochemical investigation into the distribution of gold in the tissues of animals which had received gold chloride intraperitoneally for various lengths of time. The gold is not present primarily as metallic gold, but is localized in refractile granules which are yellow by transmitted light. When subjected to reducing agents, such as hydrogen peroxide, the gold is brought to the metallic state and displays its colloidal colours with rose predominating. The gold granules are abundant in phagocytic cells, including the histiocytes of connective tissues in general and the capsules of the organs, the Kupffer cells and the reticular cells of the lymph nodes. They are also exceedingly numerous in the epithelium of the proximal convoluted tubules of the kidney. Lesser numbers are present in the hepatic cells and in the lining of the alveoli and alveolar ducts of the lung. The observed distribution is consonant with the view that phagocytosis and renal excretion are localizing factors.

Studies on Lung Tissue.

A. ROSIN (*The Anatomical Record*, April, 1947) undertook the present study on lung tissue cultivated outside the organism in the hope of extending the knowledge of the nature of the lining cells of the pulmonary alveoli by investigation of their developmental potentialities *in vitro*. Cultures of lung fragments from young rabbits show membrane-like outgrowth around the explant. The outgrowing membranes are of epithelial character if they originate from lung fragments without visceral pleura, and of mesothelial character if they originate from explants with visceral pleura. Epithelial growth also takes place in the interior of the explanted lung fragment. This epithelial growth, as ascertained by serial section, originates in the lining cells of the alveoli. The alveoli of the explanted lung tissue are frequently surrounded by a continuous layer of cuboidal epithelium or filled with epithelial sheets. These findings suggest that the lining cells of the pulmonary alveolus giving rise to epithelial growth are themselves of epithelial nature. The resemblance between proliferations of the lining cells of the pulmonary alveolus under pathological conditions and the proliferative processes observed *in vitro* are discussed.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at Ballarat on the afternoon and evening of April 20, 1947, DR. A. E. COATES, the President, in the chair.

The afternoon meeting took the form of a series of clinical demonstrations by members of the Ballarat Division divided into separate surgical and medical sections. In each section, after the demonstrations, discussions took place. The President was chairman of the surgical section and DR. DOUGLAS THOMAS, Vice-President of the Branch, was chairman of the medical section.

At the evening meeting the surgical and medical sections combined, Dr. A. E. Coates occupying the chair. A discussion of the subjects introduced in the addresses followed.

Meeting of Surgical Section.

Pulmonary Hydatid Cyst.

DR. H. E. PEARCE showed a male patient, aged forty-five years, who had been operated on some years earlier for supposed hydatid disease of the liver, but after the operation urine had been discharged from the wound. The object of demonstrating the patient at the meeting was to draw attention to the presence of a small hydatid cyst of the lung, which had not increased in size whilst the patient was under observation for the past two years. The patient looked healthy and there had been no symptoms, and Dr. Pearce invited comments on the treatment that should be adopted.

DR. C. J. O. BROWN remarked that it was extraordinary that urine should have been discharged after an operation for hydatid disease of the liver. He suggested that the original cyst might have been renal and not hepatic. With reference to the small pulmonary cyst, he was strongly of the opinion that it should be treated by operation without further observation. It had been said that small deep-seated cysts should be left alone, and that 80% of them would rupture spontaneously through the bronchial passages; but Dr. Brown did not agree with that attitude. They certainly would often rupture and expel the fluid contents, but the membrane remained and the cavity suppurated from time to time. Later, lobectomy was sometimes required to eradicate the disease. On the other hand, early operation on the cyst under discussion would not be unduly hazardous. Dr. Brown advocated the use of Fitzpatrick's bell to prevent spilling into the pleural cavity and the insertion of a mushroom drainage tube for three or four days; by the fourth or fifth day, he expected that the patient would be able to sit out of bed.

Treatment of Menorrhagia by Radium.

DR. W. T. GREENING began a report on the treatment of menorrhagia by radium by discussing the possible causes of menorrhagia. He considered that the patients could conveniently be divided into pre-menopausal, menopausal and post-menopausal groups. He stressed the great importance in all cases of a visual examination, and drew attention to the fact that multiple pathological conditions were by no means uncommonly encountered. He said that the "undiagnosed" group comprised more than 50% of the patients and that for them curettage and examination of sections should be carried out. He had found that treatment by radium was most satisfactory in that group. The radium was inserted into the cavity of the uterus when the curettage was performed, and unless the presence of carcinoma was revealed when the section was examined carefully by a pathologist, no other treatment was required. However, if carcinoma was found to be present, hysterectomy should be performed.

Dr. Greening went on to suggest that there was no necessity to refer the patients to specialists for the radium treatment. Practitioners could own radium and use it at the time of curettage as he had already outlined; but it should not be used if the patient had symptoms other than bleeding. Finally, he considered that on many occasions the operation of hysterectomy was avoidable.

DR. J. P. L. GRIFFITHS said that he did not agree with Dr. Greening's advocacy of the utilization of radium by those who had not had special training in radiotherapy, and he favoured hysterectomy for the patients under discussion.

Allbright's Syndrome.

DR. MERVYN ROBINSON showed, as an example of Allbright's syndrome, a male patient, aged nineteen years, who at the age of six years had been an in-patient at the Children's Hospital, Melbourne, because of *osteitis fibrosa* with pathological fracture. An exploratory operation there had failed to disclose the presence of a parathyreoid tumour, but a biopsy examination of material from the femur had been undertaken. Since that time the patient had sustained numerous pathological fractures, and extraordinary deformation had taken place, not only in the long bones, but also in the skull. Dr. Robinson said that Allbright's syndrome consisted of bone lesions of *osteitis fibrosa*, brown pigmentation of areas of skin and endocrine dysfunction. It appeared to be present in the case of the patient shown to the meeting. The blood calcium content was 11·0 milligrammes per 100 millilitres of blood; the blood phosphorus content was 5·0 milligrammes per 100 millilitres of blood; and the plasma phosphatase content was 73 units (normal two to eight units). The radiological appearances of the deformed skull bones were those of intense sclerosis and not rarefaction. Presumably owing to pressure at the foramina, optic atrophy and facial nerve paresis were present on the left side.

DR. CHARLES OSBORN commented on the similarity of certain aspects of the skull to the changes seen in *leontiasis ossium*, but he pointed out that the occipital deformity of the patient was not that usually seen in the disease mentioned.

DR. JOHN DEVINE stated that abnormal bone development produced, at different times, all the stages between dense bone formation and the rarefaction of *osteitis fibrosa cystica* of the localized type; thus atypical cases occurred.

DR. A. E. COATES referred to the curious condition of creeping periostitis of the skull, which could produce the intense thickening and sclerosis seen in the skull in the present case.

Injuries in the Region of the Elbow.

Dr. Robinson also showed two patients who had had severe injuries in the elbow region.

One patient was a man, aged thirty-two years, who had, in November, 1946, sustained a compound fracture of the right elbow with such extreme comminution that amputation had been proposed. The patient had refused the proposal, and the elbow had become very deformed, without movement and with a discharging sinus. A false joint had formed between fragments of radius and humerus, and a mass of firm callus had replaced the elbow joint, the bones being at an angle of 150°. The functions of the hand were practically unimpaired.

Dr. Charles Osborn expressed the opinion that the patient might have been better off had he submitted to amputation.

DR. T. H. ACKLAND considered that the arm had rightly not been amputated, inasmuch as the nerves to the forearm were intact; that was the best criterion to apply in doubtful cases.

DR. W. ANGUS questioned whether, from the beginning, sufficient attention had been paid to physical therapy for the hand.

DR. G. NEWMAN MORRIS mentioned that injection of the cervical sympathetic had been used to save a doubtfully viable limb.

Dr. A. E. Coates supported the conservative treatment of the limb under consideration, but thought that fixation in flexion would have been preferable.

Dr. Robinson's other patient, a man, aged thirty years, had in December, 1946, sustained a compound fracture of the right elbow, and the lateral humeral condyle, carrying the radius with it, had been upwardly displaced. The arm had been treated conservatively in extension, and at the time of the meeting the elbow was practically fixed in an extended position.

Dr. A. E. Coates stated that, in his opinion, the loose outer humeral fragment should have been nailed, but that, since malunion had occurred, the elbow should be fixed in the best functional position.

Surgical Methods in Treatment of Peptic Ulcer.

DR. J. P. L. GRIFFITHS described a series of fifteen patients with peptic ulceration treated surgically, and differentiated a number of methods he had used for special reasons. He illustrated his selection of the method by recounting six characteristic case histories. The ages of the patients ranged from forty years to sixty-three years.

In one case gross pyloric obstruction had been demonstrable from X-ray photographs, and Dr. Griffiths had found at operation that there was massive induration around a

duodenal ulcer with almost complete obstruction. In that case he had carried out posterior "no-loop" gastro-enterostomy, and six weeks later the patient was well and free of symptoms. In another case the radiographic indication was merely deformity of the duodenal cap without any delay in emptying. Dr. Griffiths had performed gastric exclusion, and five months later the patient had gained in weight and could eat full meals without pain and with only slight acidity. In another example, a patient, aged forty years, had had duodenal ulceration, verified radiologically, for twelve years, and from pre-operative X-ray examination it was ascertained that an acutely "J"-shaped stomach was present with deforming cicatrization of the duodenal cap. No gastric ulcer was seen at operation, but the first part of the duodenum was deformed. Eight out of eleven vessels on the greater curvature and several on the lesser curve were ligated and posterior gastro-enterostomy was performed, a procedure which amounted to "physiological gastrectomy". Four years later the patient had put on weight and had had no indigestion.

Dr. Griffiths then described a patient upon whom he had operated after several years of recurrent attacks of hæmatemesis and melena associated with pain in the left side of the upper part of the abdomen and the loss of more than three stone in weight. At the operation the ulcer was found high on the lesser curvature, and partial gastrectomy was carried out with excision of the ulcer, the upper part of the stomach being left as a tubular prolongation of the œsophagus. More than two years later the patient had regained eighteen pounds in weight and could eat a three-course meal in comfort.

Dr. Griffith's next case illustrated the value of operation for severe hæmorrhage and pain imminently threatening life. Transfusions of blood had been repeatedly given, and, with difficulty, the percentage of hæmoglobin was lifted to over fifty, only to fall within a day or two to just over thirty. As there was radiological evidence of the presence of a large gastric ulcer on the lower third of the lesser curvature, operation was advised. Partial gastrectomy was carried out under intratracheal nitrous oxide and oxygen anæsthesia, and before and again after operation a transfusion of one pint of blood was given. The patient recovered, and within three weeks the percentage of hæmoglobin had reached seventy.

The sixth case history recounted by Dr. Griffiths was atypical. A woman, aged fifty years, had for three years been subject to retching attacks, and on one occasion had vomited blood. In the X-ray photographs partial thoracic stomach was visualized, but no sign was found of ulceration. At the operation left phrenic avulsion was performed, and six weeks afterwards the retching had been materially reduced and the abdominal pain was less prominent.

Dr. JOHN DEVINE said that in some cases of thoracic stomach, bilateral phrenic crushing gave better results than unilateral avulsion.

Dr. C. J. O. BROWN congratulated Dr. Griffiths on his demonstration, but questioned the wisdom of using nitrous oxide anæsthesia in the circumstances described. Dr. Brown considered nitrous oxide to be the worst possible anæsthetic agent for patients with a low hæmoglobin value, because if the level was less than 35% cyanosis could not occur; in his opinion ether was the best anæsthetic agent on such an occasion. With reference to the thoracic stomach, Dr. Brown expressed the opinion that a phrenic crush would have been preferable to avulsion, but in either case the phrenic paralysis was not very helpful. In suitable cases he had found it satisfactory to pull the stomach down and to suture the diaphragm snugly around the œsophagus.

Dr. CHARLES OSBORN said that he was using more conservative methods in the treatment of peptic ulcer than those he had employed years earlier. He had realized that an appreciable proportion of patients who had been submitted to gastrectomy had subsequently developed anastomotic ulceration; moreover the operation carried a fairly high mortality. He then referred to the fact that the most recent attack on the problem had been via the nervous system, and some dramatic results had been claimed after division of the vagi in the chest. He thought that gastric exclusion was an unsatisfactory operation.

Urology.

Dr. R. G. DAVIDSON demonstrated from a series of patients with urological conditions the following conditions: two examples of cysts of the kidney treated by excision and the use of muscle and fat grafts; the conservative treatment of hydronephrosis; the need to remove hypertrophied and œdematous tissue endoscopically from the bladder neck, before satisfactory emptying of the bladder could be obtained after operative removal of diverticula of the bladder; the removal of an enormous right-sided hydronephrosis; and urinary incontinence associated with meningocele with very gratifying control of micturition after presacral neurectomy.

Meeting of Medical Section.

Rheumatic Heart Disease.

Dr. C. E. RICHARDSON showed a boy, the second of three children in a healthy family, who during the previous six months had developed certain signs and symptoms indicative of heart disease. He said that the boy had been brought for examination by his mother, because the pallor and tiredness and undernourishment were increasing rapidly. He had not at any time had swelling or tenderness around the joints, but had complained of pain at night-time, especially in the region of the knees. Dr. Richardson said that on examination it was found that the boy had several teeth in urgent need of attention, but the throat looked healthy; the heart was not demonstrably enlarged, but a definite thrill was palpable at the base and towards the apex, with a very loud rough systolic bruit, maximal at the aortic area and transmitted towards the apex down the sternum; in each arm, the diastolic blood pressure was 64 millimetres of mercury and the systolic pressure was 118 millimetres. It was found on examination of the blood that the red cell count was 4,890,000 per cubic millimetre, the hæmoglobin value was estimated at 96%, the white cell count was 11,000 per cubic millimetre, 18% of the cells being monocytes, and, apart from the evidence of monocytosis and mild hypochromic anæmia, no other abnormalities were noted in the blood films. After careful radiological examination it was stated in the report that the cardiac diameter was somewhat increased; the heart had a slight likeness to the "wooden shoe" deformity sometimes caused by a defect in the pulmonary artery; there was no enlargement of the pulmonary conus or of the left auricle (which would seem to exclude a mitral lesion); and there was no notching of the ribs or detectable hypoplasia of the aortic knob. The report after analysis of the electrocardiogram was as shown in Table I.

TABLE I.

Observation.	Lead I.	Lead II.	Lead III.
P wave	Positive.	Positive.	Positive.
P-R interval	0·12	0·12	0·12
QRS time	0·08	0·06	0·06
S-T interval	Normal.	Normal.	Normal.
T wave	Positive.	Positive.	Positive.
Conduction	Normal.	Normal.	Normal.
Rhythm	Normal.	Normal.	Normal.
Balance	Normal.	Normal.	Normal.
Ventricular complex	Normal.	Normal.	Normal.

From a blood sedimentation test it was found that, the sedimentation time being sixty minutes, the sedimentation index was six millimetres.

Dr. Richardson said that he considered the diagnosis to be rheumatic aortitis, and invited those present to examine the boy and to discuss the diagnosis.

Dr. G. A. PENINGTON said that he was satisfied that the diagnosis was rheumatic aortitis with perhaps some degree of mitral insufficiency; but he had found no evidence on physical examination to suggest the presence of any congenital cardiac anomaly.

Dr. DOUGLAS THOMAS, from the chair, said that he, too, thought that the condition was of rheumatic origin, and could find no evidence of coarctation of the aorta.

Leuchæmia.

Dr. Richardson also showed a girl, aged four and a half years, as the subject of leuchæmia with the consequent unfavourable prognosis. He said that she was the older of two children in a healthy family, without predisposition on either side to any blood disorder. She was a full-time breast-fed healthy baby, and had not shown signs of jaundice or hæmorrhagic tendency early in life. The only illness before the current one was an attack of gastro-enteritis of mild degree at the end of the first year.

Dr. Richardson then described how, ten weeks earlier, the child had become listless and disinclined for play, and looked pale and ill. The local doctor had prescribed an iron tonic and sent her for a holiday at the seaside; but the pallor had increased and anorexia developed, until she became so weak that she was no longer able to walk about

without considerable dyspnœa. Dr. Richardson had examined her for the first time five weeks before the meeting, when she was desperately ill and very pale and weak, though there were no signs of hæmorrhage or of stomatitis. The temperature was 102° F., the pulse rate was 140 per minute and the respiratory rate was 32 per minute. Lymphatic glands were palpable in the axillæ and groins, the spleen was palpable and the liver was enlarged, the lower edge being two fingers' breadth below the right costal margin. The heart was enlarged, the apex beat being localized in the fourth left intercostal space just outside the nipple line, and a definite apical systolic murmur was heard. The systolic blood pressure was 82 millimetres and the diastolic 58 millimetres of mercury. Small purpuric spots were seen over each leg. Dr. Richardson had received at that time a report on the examination of the child's blood, in which it was stated that the red cell count was 1,330,000 per cubic millimetre, the white cell count was 6500 cells per cubic millimetre, and the hæmoglobin value was estimated at only 30%, and, in a study of the films, no granulocytes were seen and 60% of the white cells were described as lymphoblasts.

Dr. Richardson went on to say that a direct transfusion of twenty ounces of blood was made promptly and that 30,000 units of penicillin were injected every three hours. Within two days the child's general condition had obviously improved, though the temperature had risen at times to the vicinity of 105° F.; the glands soon became impalpable and the purpuric spots disappeared. The red cell count rose to 2,550,000 per cubic millimetre and the white cell count was 2000 cells per cubic millimetre after the transfusion; the hæmoglobin value reached 48%; few polymorphonuclear cells were seen in the films, but a preponderance were small lymphocytes and lymphoblasts. Two weeks later, though the temperature had subsided and the improvement of the general condition had been maintained, another transfusion of a pint of blood was given, and two days later the blood was reexamined. The red cell count was then 3,000,000 per cubic millimetre, the white cell count 1750 per cubic millimetre and the hæmoglobin value 70%. Small lymphocytes were said to form 90% of the leucocytes, the remainder being juvenile cells chiefly at the late stage of "blast" cells.

Another blood examination was made after eight days, and by then the red cell count had risen to 4,060,000 per cubic millimetre and the hæmoglobin value to 80%, and the white cell count was 2500 per cubic millimetre, the film being described as on the previous occasion. Dr. Richardson said that the penicillin therapy was continued, together with the use of iron and a liver preparation, and the blood had been examined shortly before the day of the meeting. The number of red cells had fallen to 2,880,000 per cubic millimetre and the hæmoglobin value to 68%, and the white cell count was 2500 per cubic millimetre; of the leucocytes 60% were described as small lymphocytes and 16% as "blast" cells, but the remaining 24% were neutrophile cells, chiefly small ones.

In conclusion, Dr. Richardson drew attention to the general appearance of health of the child; but he said that bone marrow studies were to be made, "Pentnucleotide" would be used and a further transfusion of blood would soon be required; the fever and the increased pulse rate had subsided and the cardiac murmur was no longer audible.

DR. H. BOYD GRAHAM said that he had taken particularly close interest in the details of the clinical history of Dr. Richardson's patient, because there were many parts in common with a contribution Dr. Graham had made earlier that month at a meeting of the Melbourne Pædiatric Society. In his opinion the diagnosis of leuchæmia could not yet be made with certainty by Dr. Richardson, and even if that was the probable diagnosis, any other possibilities should be borne in mind and safeguarded by appropriate treatment. Dr. Graham drew attention to the repeated gross granulocytopenia in the blood reports and to the series of low white cell counts, which alone would justify consideration of the diagnosis of agranulocytosis, the term introduced in 1922 by Werner Schultze and still chosen in 1946 by Maxwell Wintrobe from a host of synonyms. Since 1922 transfusions of blood were more commonly given, as compatibility was better understood and blood from carefully selected donors was more readily available; antibiotics such as penicillin and streptomycin had come into use with powerful influence over many infective agents. Those two factors alone could account for the modification of the lethal features in Schultze's syndrome, since they eliminated in treated subjects the necrotic foci of infection and allowed time for the damage to the bone marrow and reticuloendothelial system to be followed by regenerative processes, restoring the natural defences of the body to save it from what would otherwise have been a fatal knockout blow. Since Plum's book was published in 1939, it had been realized that in about one-third of the reported cases the ætiology was obscure. Dr. Graham agreed that "Pentnucleotide" or leucocytic cream or some bone marrow preparation might have an influence in stimulating granulocyte formation, but that need might have passed in the present case. He thought that radiotherapy or any treatment that might depress hæmatopoiesis was contraindicated for patients such as that of Dr. Richardson, at least until the diagnosis of leuchæmia or lymphosarcoma could be made reliably. Infective mononucleosis, aplastic anæmia (hypoplastic in reality) and aleuchæmic leuchæmia remained with agranulocytosis in the differential diagnosis. The prognosis was by no means unfavourable, and the progress already made justified an optimistic outlook.

Dr. Douglas Thomas related certain details of the history of a boy, aged sixteen years, in his care at the Royal Melbourne Hospital. He was suffering from extreme anæmia of the aplastic type and had some purpuric manifestations. He had been treated by means of blood transfusions and penicillin, and within three weeks he had shown considerable improvement. He had been kept in the ward for a further four weeks under observation after apparent return to health. However, Dr. Hilda Gardner had reported that she was certain, from marrow studies, that the condition was monocytic leuchæmia in remission. Dr. Thomas went on to say that, with the ability to combat the infection or septicæmia, they might, as Dr. Boyd Graham had said, be able to tide the patients over and make the disease episodic. It might be revealed that a disease usually regarded as fatal would turn out to be episodic or even curable. Dr. Thomas advised Dr. Richardson to continue to protect the child from infection and to maintain the blood standards.

DR. IAN WOOD supported the previous speakers in refusing to accept the diagnosis of leuchæmia as inevitably correct until it was indubitable. He said that it would be of interest to know that Dr. F. M. Burnet, at the Walter and Eliza Hall Institute, had a new test for glandular fever. That test, together with the Paul Bunnell test, would provide help in at least three-quarters of the cases; it was a tragedy to misdiagnose leuchæmia as mononucleosis.

Diaphragmatic Hernia.

DR. G. T. JAMES demonstrated from X-ray photographs of a patient's chest the presence of the whole of the colon in the left side of the chest, though the stomach was placed rather low in the abdominal cavity; it appeared that the outer part of the left side of the diaphragm was entirely missing. Dr. James said that the patient, a miner, aged fifty-two years, had come under notice in the chest clinic at the Ballarat Hospital, to which he had been referred on account of silicosis and dyspnœa. Prior to systematic examination the patient had been sent for radiological investigation; an opaque meal was given, the X-ray photographs shown were prepared and the radiologist on the evidence had made the remarkable diagnosis single-handed.

Dr. Douglas Thomas recalled the case history of a young married woman who had become increasingly breathless and had had a hæmatemesis. X-ray examination after a barium meal was carried out and showed that half the colon and a substantial portion of the stomach were in the left side of the thorax. Interrogation had brought to light the information that when her first baby was delivered the patient had had a sudden onset of pain with intense dyspnœa; presumably during labour she had put a considerable portion of the bowel into the thorax. Dr. Thomas added that he agreed with Dr. James that it was a very smart "pick-up" on the part of Dr. Dick, the radiologist, to diagnose diaphragmatic herniation from the films without any knowledge of the history of the patient.

Spontaneous Pneumothorax.

Dr. James also demonstrated from a series of X-ray photographs and from the clinical histories of four patients the subject of spontaneous pneumothorax, which was of interest both to physicians and to surgeons. In each instance the patient was regarded as non-tuberculous and was "Mantoux-negative"; the blood sedimentation rate was normal; no evidence had been found, clinically or radiologically, of any tuberculous lesion; no pleural effusion had occurred; there had been complete reexpansion of the lung; and in only one instance had the blood serum yielded the Wassermann reaction.

Dr. James's first example was one of complete pneumothorax, which had occurred in a man, at the age of forty-

two years, after a severe effort, and for months there had been no reexpansion. The patient had refused further investigation until he was forced to seek treatment for increasing dyspnœa, inability to work and weakness from loss of weight. At Saint Vincent's Hospital, Melbourne, a large collapsed cyst of the lower lobe of the lung was found by thoracoscopic examination. Successful surgical removal had been followed by complete reexpansion of the lung and disappearance of the symptoms.

Dr. James then referred to a male patient, aged forty-eight years, in whose case spontaneous pneumothorax following effort had been succeeded by complete reexpansion in three weeks. That patient was found to yield a "triple positive" result to the Wassermann test.

The next patient, a youth, aged twenty-one years, had twice sustained spontaneous pneumothorax on the right side after accidental inhalation of bromine gas, and on each occasion reexpansion had been complete after two weeks.

The last of the case histories recounted by Dr. James was that of a lad, aged nineteen years, who had had spontaneous pneumothorax six times after effort, with complete reexpansion on each occasion. Originally the pneumothorax was on the right side and reexpansion was complete in four weeks; but immediately afterwards complete pneumothorax had occurred on the left side.

Dr. James invited discussion of the subject from certain aspects. Tuberculosis was not a common cause of spontaneous pneumothorax; it should be relegated to its proper place in the ætiology, which was in reality rather low down on the list. Generalized emphysema could hardly be considered seriously as the cause of the trouble in young patients. Effort and irritating gases could not of themselves produce pneumothorax in a healthy lung. Rupture of an air-containing vesicle due to localized emphysema was a probable cause in certain cases. It seemed to be probable that, in the cases occurring in young people which were by no means infrequent, the basic cause was to be found in a congenital anomaly rendering portion of the lung unable to withstand abnormal or unusual stresses.

Dr. G. A. Penington said that the incidence and mechanism of spontaneous pneumothorax had been thoroughly traversed in an article in the Baltimore journal called *Medicine* a few years earlier. American workers had investigated the incidence of spontaneous pneumothorax and of emphysema. Interstitial emphysema spread to the mediastinum along a septum rupturing into the pleural cavity or producing mediastinal emphysema. The effort of coughing increased the intrabronchial pressure with the glottis closed. Venous obstruction caused minor tears in the epithelium at the junctions. He went on to say that it had been shown that when a chest was opened under water it contained air in abnormal situations in the interstitial tissues. He thought it probable that spontaneous pneumothorax, when associated with the inhalation of irritant gases, was due more to violent coughing than to the direct effect of the irritant.

Essential Thrombocytopenia.

DR. BERNARD BAKER showed a boy, aged seventeen years, who had been admitted to hospital fourteen times in the previous seven years on account of epistaxis. He had suffered from no other illness and there was nothing relevant to his complaint in the family history. He had always taken an active part in sports at school and was reasonably sturdy though somewhat underdeveloped. He followed the occupation of market gardening.

The present illness had commenced nine days before the meeting, when he had had a seizure while at work followed by five more seizures in twelve hours. On his admission to hospital he was drowsy, but was able to cooperate; bruises were evident on his legs, and blood oozed from a cut on his lower lip and from his tongue. His tendency to bleeding was known at the hospital, so that it was suspected that he had had an intracranial hæmorrhage. Lumbar puncture was performed, but the cerebro-spinal fluid was found to be normal in cellular, protein and chloride contents. A detailed blood examination was made; the red cell count was 4,980,000 per cubic millimetre; the hæmoglobin value was estimated at 104%; the white cell count was 9,500 per cubic millimetre; and in the films, which were normal in other respects, platelets could be found only occasionally. The bleeding time was thirty-two minutes; the coagulation time was three and a half minutes; 1600 platelets were counted per cubic millimetre; and the result of the capillary resistance test was positive.

Dr. Baker said that sternal puncture had not been made, but was contemplated should the patient agree to operation. The treatment was merely empirical; no other disorders and no seizures had occurred after his admission to hospital. The hospital records were examined and it was disclosed that the shortest bleeding time had been eleven minutes and the longest coagulation time eight minutes. The platelets had not been counted, but the reports on blood films always indicated that few, if any, platelets had been seen. On several occasions the presence of purpuric spots was recorded, but not that of splenomegaly. X-ray photographs had been prepared several times for study, but no pathological appearances relating to recurrent epistaxis were to be seen.

Dr. Baker summarized the position by stating that he regarded the diagnosis to be essential thrombocytopenia, the seizures being of purpuric origin, and he considered that splenectomy was indicated. The essential features were: recurrent, severe epistaxis treated repeatedly by transfusion of blood; extraordinarily low platelet count; prolonged bleeding time; normal coagulation time; and positive result to the capillary resistance test.

DR. IAN WOOD stated that he favoured splenectomy for chronic purpura, especially as the patient was showing signs of cerebral hæmorrhage. With regard to the choice of blood for transfusion, he considered that it was wise either to give fresh citrated blood or to give a direct transfusion of blood from the donor; the latter procedure was preferable if benefit was to be derived from platelets, which formed a sediment and were removed, at least in part, when stored blood was filtered before administration. At all events, fresh blood should be used because, if the blood cells had been stored at 4° C. for a week or two, it was known that their survival time in the recipient was curtailed.

Dr. G. A. Penington also discussed the case, after adding his testimony to the idea that penicillin and transfusion of blood might convert acutely fatal into episodic diseases. He said that it was not possible to predict what was going to happen in essential thrombocytopenia; even after splenectomy recurrences might happen; and yet, in other instances, spontaneous recovery would be made without splenectomy. He considered that, as a preliminary, it would be wise to study the bone marrow, to determine whether the disease was one in which the platelets only were involved or whether there was a pathological state affecting other elements in addition to the platelets. With that additional information, it would be clearer whether splenectomy should be advised.

DR. C. STANLEY wondered whether losing the spleen could do the patient any harm.

Dr. Douglas Thomas said that splenectomy had been performed hundreds of times, for example, in Egypt, and it was not considered to be disadvantageous.

Sulphocyanates in Essential Hypertension.

DR. E. R. G. SHEIL gave a brief account of his experiences in sulphocyanate treatment of 36 patients with essential hypertension and commented on the value of that form of treatment. He said that he gave each patient between 12 and 30 grains of sulphocyanate each week, which was sufficient to produce and maintain a blood concentration of six to eight milligrammes *per centum*. He had found that it was advantageous to discontinue treatment on one or two days each week to give the patients a rest, as more or less troublesome mental depression followed if the treatment was continuous. He had increased the dose until he had obtained a concentration of 12 milligrammes per 100 millilitres of blood, had maintained that blood level for twenty days and had then lowered the dosage to reduce the concentration to between six and eight milligrammes. During the first week of treatment patients frequently wanted to stop it because of mild mental upsets and depression; but by constant control, involving very frequent performance of the comparatively simple quantitative test for blood sulphocyanate content, and by reassurance based on experiences in other cases, Dr. Sheil had managed to get most of them to undergo full treatment unless he considered it contraindicated.

Dr. Sheil described the test he was in the habit of employing, which was facilitated by a set obtained through the courtesy of the representatives of Eli Lilly, Proprietary, Limited.

In his evaluation of the results of treatment of the 36 patients, Dr. Sheil said that there had been an average reduction of blood pressure amounting to approximately 15%; 17 of the patients had experienced falls of blood pressure, and the lowered pressure was maintained with definite benefit to the patient on the reduced blood sulphocyanate concentration; 12 of the patients had had symptomatic improvement; and in only seven cases no appreciable difference was noticed.

Dr. Sheil said that the mode of action of the sulphocyanate was practically unknown. It depressed the central nervous system and reduced the basal metabolic rate, and there was a local reduction in tissue oxidation. Definite toxicity had occurred in two cases and one patient had a mild rash. He regarded a concentration of 15 milligrammes per 100 millilitres as the lower limit of danger, and knew that he was in deep water if it rose above 30 milligrammes per 100 millilitres, which might prove catastrophic.

Dr. G. A. Penington thanked Dr. Sheil for his interesting account of his use of sulphocyanate; he had shown well how to manage some cases of essential hypertension. There was no doubt that the sulphocyanates would lower blood pressure, but some patients were not so well with the lowered pressure. He considered that it was unwise to give sulphocyanates when the blood pressure was only a little above the normal height, as that state was not necessarily of pathological significance. The persistence of the tendency for a patient's blood pressure to rise should be demonstrated convincingly before that form of treatment was initiated. Symptoms attributed to hypertension might be due to other causes, and patients were likely to become neurotic when pressure consciousness was established. If the diastolic pressure was over 130 millimetres of mercury and hypertension was increasing, sulphocyanates might well be used with the safeguards that Dr. Sheil had described so clearly.

Dr. Penington added that it was of interest to hear from Dr. Sheil that, in one of the cases, sulphocyanate treatment had been effective after sympathectomy had failed. Each case should be taken individually on its merits; but mental confusion or definite depression arising out of the treatment should be accepted as a warning that it should be stopped.

Dr. Douglas Thomas, from the chair, said that he wished to congratulate the local members on the high standard of investigation and treatment which had been revealed.

Evening Meeting.

Surgical and Medical Aspects of Post-Operative Treatment.

DR. ALWYNNE ROWLANDS read a paper entitled "Surgical Aspects of Post-Operative Treatment" (see page 390).

DR. GEOFFREY PENINGTON read a paper entitled "Some Medical Aspects of the Post-Operative State" (see page 392).

DR. IAN J. WOOD opened the discussion by stating that, in the wards of the Royal Melbourne Hospital, the members of the clinical research unit were studying the effects of diet before and after operations on the results obtained surgically. Following the work of Castle in America, it had been found that considerable benefit was derived from highly nutritious drinks given between the evening meal and breakfast next morning. The drinks used usually consisted of milk, added cream, eggs, lactose and added vitamin preparations. It was found often that high caloric feeding to the value of 3000 Calories could be administered during the day, and that nourishment providing an extra 1000 Calories could be added by means of the drinks given during the night. By that simple procedure it was possible to obtain gratifying gains in weight for patients awaiting such major operations as gastrectomy. Dr. Wood added that adherence to those principles had greatly improved the post-operative period, with regard to both gains in weight and avoidance of infections. Should the intake by the oral route be inadequate, intermittent gavage or intravenous therapy was usually indicated. Dr. Wood expressed the hope that casein hydrolysate would soon be available for intravenous administration in Australia. Thus the patient could be given a high intake of nitrogen for building up into proteins.

DR. CHARLES OSBORN, after complimenting Dr. Rowlands and Dr. Penington on the interesting way in which they had introduced the subject under discussion, said that he was anxious to avoid reiteration, but would confine his contribution to a few points that were perhaps worth stressing. In his pre-war experiences and also as a prisoner of war he had noted the high incidence of post-operative venous thrombosis and embolism, and surgical literature was full of the subject. Dr. Rowlands had given an excellent survey, but there were some additional points to be mentioned. In an analysis of 27,000 autopsies in Minnesota, it was found that fatal pulmonary emboli had occurred in 2·8% of cases and accounted for 5·8% of post-operative deaths. Only approximately one patient in five was killed at the first attack, so the incidence of pulmonary embolism was high. If the condition was undiagnosed by the clinical signs, the remaining four out of five who had had an embolus were going to die from further embolism.

Dr. Osborn then discussed some aspects of the treatment of thrombophlebitis and of quiet thrombosis. He said that thrombophlebitis was unlikely to be the source of emboli unless suppuration occurred; recognition of the condition should be the signal for operation; occasionally a red thrombus shot off and caused *phlegmasia alba dolens*, and it might even be wise to tie the vein in the other leg. On the other hand there were few signs to show the occurrence of quiet thrombosis in the calf muscles or plantar region, but it could be diagnosed by palpation and œdema.

Dr. Osborn said that the diagnosis of the presence of the thrombotic state could be made by means of daily estimations of the coagulation time and that method was already being used in Sydney. In the thrombotic state heparin was indicated; the work was on the way and should be practised in routine fashion in the near future.

Dr. Osborn stated that it was necessary that Fowler's position should continue to be adopted when there was suppuration in the abdomen, even if only to attempt to prevent subphrenic abscess formation. If the surgeon was satisfied that there was no infective condition of the peritoneum, the patient should be laid flat and the "donkey" should not be used. He advised against the custom of sitting patients up too much and too soon after operations; they could cough better downhill and could lie laterally quite soon, even while coming out of the anæsthetic state. He went on to say that nursing staffs did not seem to know those things yet; they had to be taught to eliminate pillows and to encourage early ambulation; surgeons on the Continent were doing it in 1924 and the Americans had hammered at it since then.

In conclusion, Dr. Osborn observed that accurate suturing avoided the necessity for the application of tight binders, and he also advocated more frequent use of non-absorbable suture materials, preferably with buttons on each side, as used by Lister in 1867.

DR. GEOFFREY PERN, after expressing personal appreciation of the addresses, said that patients should not be subjected to surgical operations too soon after infection; septic foci should be searched for, especially post-nasal discharges and chronic sinus infections.

DR. JOHN DEVINE recalled a memorable experience in San Francisco when he was present at a huge medical congress of some sixteen thousand doctors and no less than seven hundred vascular surgeons. From the discussion at this congress it appeared that thromboses came from the calves of the legs and that the chain or pipe leading to the lung had to be cut; both femoral veins would be tied and in sixteen instances the inferior *vena cava* was ligated. By such methods they had reduced the incidence of fatalities from pulmonary emboli, but it had sounded like surgery run riot. Dr. Devine, in conclusion, gave a brief account of the use of substances such as heparin and "Dicumarin" in thrombophlebitis and in the prophylaxis of venous thrombosis. He said that the therapy was controlled by daily estimations of plasma prothrombin, because it was by reduction of the prothrombin level that the coagulability of the blood was reduced, and hæmorrhages might follow a dangerous reduction in level. He also referred to the injection of heparin in beeswax and to the value of local applications of hot-water bottles or ice bags to the site of the thrombophlebitis.

DR. W. T. GREENING said that, after twenty years of experience as a surgeon, he believed that pulmonary phlebotic complications were tackled best by getting the patients as fit as possible and by adopting carefully considered routine procedures before, during and after operations. He regarded the pre-operative routine as very important. For interval operations he liked to bring the blood up to optimum, to give plenty of rest and to train the patients to be fit for what they had to endure. Operative routine was divided into planning of the operation itself and selection of the anæsthetic; after doing some five thousand operations he was of the opinion that "open ether" skilfully administered was the best anæsthetic. The operation should be planned like a military manœuvre. The operation known as "exploratory laparotomy" should be in the dustbin. The size of incisions should be limited, and if possible, the use of retractors should be dispensed with. Adequate and proper tools should be used; for instance, forceps should be of the proper size for the job in hand.

With reference to post-operative routine, Dr. Greening agreed with the previous speakers concerning the posturing of the patient; he advocated the use of the most comfortable position except for Fowler's position for the "dirty abdominals". He considered that in the immediate post-operative period patients were often grievously insulted by the surgeon; the surgeon took a cup of tea, but the patient

needed it often and more urgently. Thirst and pain should be alleviated. Hilton, in 1861, had published his great book on "Rest and Pain". J. B. Murphy, in 1895, had introduced the "Murphy drip" with tap water; saline solution in hot weather and tap water at other times should be used; one and a half pints should be run in in the first hour and five pints in twenty-four hours. The drip should be kept going until the patient was freed from nausea and was prepared to receive and able to absorb fluid by mouth.

Dr. Greening went on to say that he had not encountered ileus in his last 2500 cases, over 70% of which were cases of abdominal surgery, and he attributed the success largely to the use of morphine and the "Murphy drip" and to careful planning and proper preparation of the patients. It was so simple that people would not believe it worked, but it did. He had very little use for aperients in his surgical routine.

Dr. A. E. Coates, from the chair, quoted from Pope's "Essay on Criticism" the well-known lines:

> Be not the first by whom the new are tried
> Nor yet the last to lay the old aside.

He said that it was good post-operative practice to roll the patients about and to push them round, to use morphine freely, and to go slowly in using the newer preventive measures for thrombosis. It was necessary to wait until the experimentalists had produced their definitive results. Dr. Coates went on to say that he thought that the subject had been covered well by the previous speakers. It should be remembered that healing came from within and that feeding was most important. He said that unfortunately it seemed nowadays that hospitals were made for maids and plumbers, but not for patients, who were usually starved from about 4.30 p.m. until next morning around 8 a.m. Surgeons should give adequate directions and insist on compliance with them if they expected to get good results. He recommended the use of the red-line pulse tracing on the temperature chart; the course of the pulse rate was a most valuable indicator.

A MEETING of the Pædiatric Section of the New South Wales Branch of the British Medical Association was held at the Royal Alexandra Hospital for Children, Sydney, on March 7, 1947. Part of this report appeared in the issue of September 13, 1947.

Imperforate Anus with Fistula.

DR. C. H. WESLEY opened the meeting by presenting a short review of "Imperforate Anus with Fistula".

He said that imperforate anus occurred during the seventh or eighth week of intrauterine life as the result of arrested or faulty development of the rectum, anus and genito-urinary system. It occurred once in 5000 cases. Fistulæ were present in just more than half of the cases; females suffered from fistulæ a little more often than males. In the developing fœtus the allantois ran from the body stalk to the cloaca. The hind-gut was continuous with the tail-gut and the cloaca. The allantois dilated to form the bladder. The cloaca was narrow from side to side; the saddle between the allantois and hind-gut grew caudally, joining with two lateral folds; the anterior division was the uro-genital sinus and the posterior was the hind-gut. For a time the two were connected by the cloacal duct, before the cloacal membrane was absorbed or ruptured. The cloacal membrane then consisted of ectoderm and endoderm, separated by mesoderm forming a primitive perineum. The uro-genital sinus ruptured below the genital eminence, which formed, in the male, the phallus; this grew rapidly, carrying the urethra with it. The proctodeum formed opposite the hind-gut; a dimple at first, it was surrounded by mesoderm, part of which formed the external anal sphincter. The hind-gut ruptured the anal membrane and joined the proctodeum. This took place later than the rupture of the uro-genital membrane. The proctodeum might not form at all. Ladd and Gross, influenced by the investigations of E. A. Boyden, of Harvard, considered that when the tail-gut degenerated, the degeneration might go too far, so that the most caudal portion of the hind-gut was absorbed. Most other writers referred to the hind-gut failing to grow downwards.

The cause of fistulæ to the bladder and urethra and to the uterus and vagina was the fact that the patency of the cloacal duct persisted. Perineal fistula was caused by the rupture of the cloacal membrane in an unusual position. The usual point of entry to the bladder was the trigone, and the point of entry to the urethra was the membranous urethra. In the female, the Müllerian ducts, in forming the uterus and vagina and gaining an opening on the uro-genital membrane, took over a fistula already present. The fistulæ which were not so rare as others were the recto-perineal and the recto-vaginal fistulæ.

Dr. Wesley went on to say that Ladd and Gross, following the investigations of Farber on many post-mortem examinations made on subjects of imperforate anus at Harvard Children's Hospital, classified imperforate anus into four types, any of which might be associated with fistula. These were: (i) stenosis of the anal canal or rectum; (ii) membranous obstruction corresponding to the cloacal membrane at the pectinate line; (iii) a blind pouch of the rectum some distance from the perineum, no anal canal being present; (iv) a rectal pouch as described, a well-formed anal canal being present. In the male, fistulæ might be at the perineo-scrotal angle, or further forwards when the scrotum was bifid; there might be fistulæ to the bladder or urethra. In the female fistulæ might open into the uterus or vagina, at the fourchette or on the perineum. A very rare possibility was a fistula with entry to the bladder.

Associated with imperforate anus, many other congenital abnormalities might occur, such as hypospadias, omphalocele, club-foot, hare-lip *et cetera*.

Imperforate anus was recognized early in most cases because of the absence of meconium or because of its appearance from an abnormal position. If the condition was not recognized early, obstructive symptoms would appear. Cases of perineal and recto-vaginal fistulæ had at times been recognized very late, even being noticed for the first time at childbirth. Absolute obstruction early was unlikely to occur with recto-vaginal and recto-perineal fistulæ; it would occur with recto-vesical and recto-urethral fistulæ. In the latter cases meconium and bubbles of gas would be seen at the *glans penis* if hypospadias was not present. Severe constipation and misshapen stools might draw attention to a stenosis. A bulging membrane, perhaps darkened by meconium behind it, might be noted in the second type.

The most helpful investigation in early cases was the method first employed by Wangensteen and Rice. A piece of lead or a small coin was placed to mark the position of the imperforate anus; X-ray examination was then made of the baby upside down, lateral and antero-posterior views being taken. A bubble of gas would be seen some distance from the perineum; this distance could be measured. One needed to remember that it might take eighteen hours for gas to find its way to the blind end at the perineum, but no obstructive symptoms would occur within twenty-four hours.

For the treatment of the first type of imperforate anus, Dr. Wesley said that dilatation was carried out at intervals for some time. A plastic operation might have to be undertaken if dilatation was not fully successful. In the second type the membrane was incised and regular dilatations were carried out. In the third type a mid-line incision was made from the scrotum or vagina to the coccyx, the incision being full length if the fistula was being removed at the same time. The external sphincter was cut in two places. The blind end of the rectum was sought for—it might be connected to the perineum by a fibrotic band. If the fistula was to be removed it was dissected clear of the vagina or perineum; the fistula was used for traction in freeing the rectum. The fistula and rectum were brought to the surface within the external sphincter. The mucous membrane of the rectum was sutured to the skin. Dilatations had to be carried out for some time in such cases. If there was doubt about the possibility of bringing the rectum down, especially if the child was a "bad risk", colostomy should be performed and the baby returned to the ward until it was in better condition. A colostomy afforded means of further investigations. The fourth type was a very rare condition which came late to surgery on account of the well-formed anal canal. Colostomy should be performed as a first stage in the operation.

Dr. Wesley went on to say that there was diversity of opinion as to the best time to deal with recto-vaginal and recto-perineal fistula or indeed whether treatment should be attempted. The patients appeared to have some control especially when the fæces were not fluid. If possible it was better to dilate the fistula and postpone the operation until the child was aged five years at least; some writers said ten or thirteen years. The chance of success in the case of a tiny baby was too slight; the operation corresponded to a repair of a full perineal tear. Recto-vesical fistulæ would need investigation to localize the position of the openings. Recto-urethral fistula should be left alone until the child was of "a decent size".

Dr. Wesley then presented his first patient, a boy, aged nine months. He had been operated on within twenty-four hours of birth for imperforate anus. He had a complete hypospadias and a recto-urethral fistula at the membranous

urethra; his scrotum was bifid. He had had dilatation of the anal canal with Hegar's dilators and the little finger. His bowels were functioning regularly. Final surgery would not be attempted for years.

Dr. Wesley's second patient was a female infant, aged five weeks. The fistula opened at the fourchette. Dilatation was first performed within twenty-four hours of birth and the child was then returned to her mother. There had been frequent dilatation since. There was no constipation; the child was in good health.

Dr. Wesley's last patient was a female, aged one year and three months, who had come for consultation when aged one year. This child had spastic paralysis and was mentally deficient. She had a greatly distended abdomen with scybalous masses and was very constipated. X-ray examination before and after a barium enema revealed a much dilated colon with definite haustration. The fistula opened on the anterior portion of the perineum. Dilatation had been performed and the scybalæ washed out. Regular dilatation was being observed. Bowel action was regular. The child was comfortable and not worrying the mother. Probably no other surgery would be attempted.

DR. P. L. HIPSLEY in opening the discussion said that firstly he would like to thank Dr. Wesley for his clear description of the cases and to congratulate him on the results obtained. He wished to speak about a few of the cases. First was the case in which the rectum opened into the vagina in the region of the fourchette, which was a common type. Some years previously he had had a patient with that condition at the Royal Hospital for Women, Paddington. She was about to be confined at term. She said she had had very little inconvenience from the abnormality during her life as she had complete control over defæcation. Dr. Hipsley had decided to perform a Cæsarean section on her, as he considered that her comfort for the rest of her life depended on the leaving of her *levatores ani* intact, since these muscles were taking the place of her *sphincter ani*. After seeing that patient he had been reluctant to operate on a number of such subjects, because whatever one did it was very difficult to get as efficient a sphincter as that patient had. Textbook descriptions of the operations performed on these patients made the operations appear very easy, but in actual practice they were very difficult on a small child, and although one could transplant the anus to the perineal region, the sphincter control was not good, and the anus had to be kept dilated by means of Hegar's dilators for the remainder of the patient's life. Therefore, the result obtained by operation was frequently not so good as was the condition in the patient he had mentioned.

Another type of case described by Dr. Hipsley was in a female child whom he had had under his care at the Royal Alexandra Hospital for Children many years previously. The infant had a congenital stricture of the rectum, about three inches from the anus. Various measures were adopted to dilate the stricture. First repeated dilatation with Hegar's dilators was tried, then dilatation after division of the stricture with the diathermy knife, but within a few weeks the stricture contracted down again. Finally, after some years Dr. Hipsley had performed a colostomy; a few weeks later he had removed the coccyx and thus exposed the rectum, and after making a longitudinal incision through the stricture had united it transversely. The rectum was kept dilated for some months and then the colostomy was closed. Since that had been done there had been no further trouble. The girl was seventeen years old at the time of the clinical meeting.

Dr. Hipsley went on to say that the only other type of case to which he wished to refer was that in which the large bowel ended at about the level of the pelvic brim. The only way to save the child's life in these cases was to perform a colostomy, hoping that at some future date one would be able to bring the blind end of the colon down to the perineum. It was only fair in those cases to warn the parents that the final result would be doubtful and to let them decide whether a colostomy which might be permanent was worth while.

DR. T. Y. NELSON congratulated the speakers. He said that the case of the imperforate anus had been very clearly put. He was particularly interested in the subject because he had undertaken to give a post-graduate lecture with the following title: "When is the right time to operate on children for different abnormalities?" The time in imperforate anus was clear—it was an urgent operation; the question about the recto-vaginal fistula was not so clear, and he was very pleased to have heard the conservative opinions expressed at the meeting. They would serve as a guide to those who had to deal with such problems.

NOTICE.

THE New Zealand Biennial Conference (British Medical Association) will be held from February 3 to 6, 1948, at Dunedin. In connexion with this conference an overland trip to Milford Sound is to be organized. The outward trip is a three-day walk over the famous Milford track, while the return journey will be by motor-car over the recently constructed Eglinton Valley highway. This trip offers an unrivalled opportunity of seeing something of the scenic beauties of the fiord region of New Zealand. The total cost will be about £20 per head from Dunedin. Any prospective visitors who are interested are asked to communicate as soon as possible with the Conference Secretary, Dr. Murray McGeorge, at Dunedin Hospital, Dunedin.

The Royal Australasian College of Physicians.

ANNUAL MEETING.

THE ninth annual meeting of the Royal Australasian College of Physicians was held at Adelaide on Thursday and Friday, May 1 and 2, 1947.

At the meeting of the general body of Fellows, Dr. E. H. Derrick, of Taringa, Queensland, Director of the Laboratory Section of the Queensland Health Department and Acting Deputy Director of the Queensland Institute of Medical Research, was elected a Fellow of the College under Article 40 of the Articles of Association, which provides for nomination by the Council for election as Fellows of such persons as have in the opinion of the Council sufficiently distinguished themselves in any branch of medical science or internal medicine. At this meeting also the following members were elected under Article 38 of the Articles of Association to Fellowship of the College: Dr. Phyllis Anderson, Dr. Stuart Marshall and Dr. D. G. R. Vickery, of New South Wales; Dr. R. C. E. Brodie, Dr. M. C. Davis, Dr. J. A. McLean, Dr. K. F. O'Donnell, Dr. L. E. Rothstadt, Dr. A. J. M. Sinclair and Dr. Guy Hale Springthorpe, of Victoria; Dr. M. E. Chinner, Dr. Ivan S. Magarey, Dr. C. B. Sangster and Dr. J. G. Sleeman, of South Australia; Dr. Clive H. Sippe, of Queensland; Dr. G. R. Kirk, of New Zealand.

The following candidates who were successful at examinations held in Australia and New Zealand were admitted to membership of the College in Sydney on April 24, 1947, or in Adelaide on May 1, 1947: Dr. F. J. Collett, Dr. B. A. Curtin, Dr. W. G. Livingstone, Dr. R. D. Puflett, Dr. John Sands, Dr. D. S. Stuckey and Dr. P. C. P. Waugh, of New South Wales; Dr. A. J. Barnett, Dr. M. V. Clarke and Dr. H. D. Steward, of Victoria; Dr. R. E. Britten Jones, Dr. J. S. Covernton, Dr. J. V. Gordon and Dr. P. W. Verco, of South Australia; Dr. J. P. Millar and Dr. G. A. Robbie, of Tasmania; Dr. J. L. Adams, Dr. D. McR. Hanna, Dr. J. R. Hinds, Dr. J. A. Kilpatrick, Dr. W. R. Lang, Dr. R. W. Medlicott, Dr. J. L. Reynolds and Dr. F. B. M. Woodhouse, of New Zealand.

Annual Ceremony.

The annual ceremony of the College was held in the Bonython Hall of the University of Adelaide. The proceedings were opened with an address by the President, Dr. S. A. Smith, who thanked His Excellency the Governor of South Australia, Sir Willoughby Norrie, for the honour of his presence, and the Chancellor of the University of Adelaide for the help and courtesies which the College had received from the university. He also welcomed the Chief Justice of South Australia, Sir Mellis Napier, the Chief Secretary, Mr. A. Lyell McEwan, the Speaker of the House, Sir Robert Nicholls, and Sir Henry Newland. He conveyed the apologies of Dr. Hugh Poate, President of the Royal Australasian College of Surgeons, and welcomed the representatives of that College, Dr. I. B. Jose and Dr. L. C. Lindon.

As this was the first annual ceremony of the College to be held in Adelaide, the President briefly reviewed the early history of the College. He said that twenty years earlier there had been few opportunities in the widely scattered States of Australia and in New Zealand for physicians to come together. There was no meeting ground for the exchange of ideas and the discussion of those problems that were of common concern to physicians, and there was no body devoted to the maintenance of a high level of knowledge of internal medicine, which was so important to the common weal. This caused disquiet in the minds of physicians and

surgeons, and in 1927, acting with characteristic decision, the surgeons came straight out and formed a College, the Royal Australasian College of Surgeons, thus providing for those whose special interest was in surgery, and for the public, who needed guidance in these matters, an authoritative body similar to those in England and the United States of America. Because of the somewhat different nature of the problems confronting the physicians, and possibly because of traditional caution, three years elapsed before the Association of Physicians was formed. This was a limited body, confined almost entirely to senior teachers of medicine within the universities, and was under the presidency of Sir Richard Stawell. The association was successful in its objects of bringing physicians together at regular meetings, and by the stimulus of discussion and the greater stimulus of criticism, helped to broaden the knowledge and outlook of its members. But it soon became apparent that the association was too limited in its scope, and perhaps selfish, particularly in that it did not provide for the younger physicians, surely the most important group. Finally, at one of its regular meetings held in Adelaide in 1934, it was unanimously decided to establish a college. In May, 1936, the preliminary work had been completed and a constitution, modelled on that of the Royal College of Physicians of London, was authorized. Thanks to the support of the Commonwealth Government of Australia and to the Government of New Zealand, His Majesty the King graciously conferred a Royal title on the College, which was ultimately inaugurated in December, 1938, in Sydney.

The College entered its life with the blessings of its friends. At its inauguration it received greetings from the Royal Australasian College of Surgeons, from the Royal Colleges of Physicians of London and of Edinburgh, and from similar bodies in Canada and in the United States of America. The President expressed the admiration and gratitude felt for the physicians of North America, and paid a tribute to the breadth of vision and international outlook which they showed; but he emphasized that it was to England that the Royal Australasian College turned for its hopes, inspiration and guidance. He believed that the College was actuated by the same ideals as those of that old and honoured body, the Royal College of Physicians of London. In this connexion the recent establishment of Empire travelling professorships in medicine was noteworthy. By the generosity of a New Zealand family, an endowment provided for the annual interchange of distinguished scholars and teachers between Great Britain and the British dominions overseas, the fund being administered by the president of the Royal College of Surgeons of England in collaboration with the president of the Royal College of Physicians of London and the presidents of the two Australasian Colleges. The President pointed out that there were now in Australasia two Colleges, one of physicians and one of surgeons, and another body, the Regional Council of the Royal College of Obstetricians and Gynæcologists, which had appropriately not yet severed the maternal connexion, all with a common aim—to raise and maintain the level of special medical and surgical skill available to the general public.

The President reminded those present that the establishment of the College had been brought about by the work of men in all States and in New Zealand, and that its activities were made possible by the generosity of the Government of New South Wales, of the Nicholas brothers and of others. It was the hope of those with the interest of the Royal Australasian College of Physicians close to their hearts that its work could be encouraged still further. He added that in the nine years of the College's existence it had made a good start towards achieving its objects. Its regular meetings, held twice a year, were well attended, and the standard of scientific contributions was maintained at a satisfactory level. The College had reached the stage when the only normal method of entry was by examination held twice a year. The Board of Censors demanded a high standard and was determined to maintain it, and successful candidates were men who had shown a high degree of practical knowledge and skill in internal medicine. The President had heard it said that the membership of the Royal Australasian College of Physicians was the most popular higher qualification in Australasia, and he knew of no reason to disagree with this statement. Other activities included the first steps towards the establishment of a physician's library made possible by a generous donation by the widow of Professor Arthur Edward Mills, one of the foundation Fellows of the College. The research activities were small as yet; but an early benefactor, the late Mr. Thornton Tweddle, of Melbourne, had endowed the research scholarship which bore his name. Under the auspices of the College, Mrs. Annie B. Cunning had founded in perpetuity a lecture to further knowledge of the problems of nutrition, and the family of the late Dr. George Rennie had provided for triennial lectures on nervous disease. Dr. T. F. Ryan, of Melbourne, had also established two scholarships in clinical medicine, one at the Royal Melbourne Hospital and the other at Saint Vincent's Hospital, Melbourne. The latest foundation was the Archibald Watson Memorial Lectures, the first of which was to be delivered that evening by Sir Henry S. Newland. These lectures were under the joint administration of the two Australasian Colleges.

There was another purpose of the College, and a most important one, which should be mentioned. At the first annual ceremony held in Melbourne, the President, Sir Charles Blackburn, had referred to the hope that the College would give some broad national advisory service, as was the case in Great Britain and to some extent in New Zealand. He referred to its function of advising governments in matters of importance relating to the national health. There were many highly important matters of this kind which did or would occupy the minds of governments. One that readily suggested itself was the control of tuberculosis. Dr. Smith wished to make it clear that the Royal Australasian College of Physicians was the most competent body to give advice on important aspects of such matters, and it was willing and eager to do so. The College was concerned only with the technical or professional aspects of the public health. The President believed that the whole problem of governmental attack on general problems of health of the nation might be compared to the operations of a company manufacturing motor-cars. Such a company had to consider its economic, its technical and its distribution problems. In a health connexion the first and third of these—namely, the politico-economic and the distribution problems—were no concern of the College; but in the second, the technological aspects, it was deeply concerned, and it was the body best qualified to advise governments so that the general public would get the best results. There were other problems also of a national character in which the College was anxious to help.

With this brief statement of its history and aims, the President commended the Royal Australasian College of Physicians to the citizens of South Australia and indeed to the people of Australasia. At the conclusion of his address the newly elected Fellows and Members of the College who were present at the ceremony were presented to the President by the Censor-in-Chief.

Archibald Watson Memorial Lecture.

Sir Henry Newland delivered the first Archibald Watson Memorial Lecture, which was given under the auspices of the Royal Australasian College of Physicians and the Royal Australasian College of Surgeons (see page 381).

Correspondence.

EXOMPHALOS.

SIR: Reports in recent numbers of THE MEDICAL JOURNAL OF AUSTRALIA (October 5, 1946, July 12, 1947) of cases of exomphalos successfully treated by operation renew interest in an otherwise hopeless condition. May I congratulate the surgeons concerned, Mr. George R. Hemming and Mr. Geoffrey Wien-Smith, and say how important I think it is to bring these successful cases to the notice of the profession because of the attitude of despair with which the condition is regarded by some. This is shown by a textbook comment that exomphalos is of pathological interest only, and the statement (*British Medical Journal*, Volume I, 1944, page 230) that "when the sac contains all or a large portion of the liver, operation is useless". That this is not so, is now clearly shown by a series of cases in which the liver was outside the abdomen, but which have nevertheless been successfully operated upon, namely, those of Hemming and Wien-Smith which you report, one which I reported in 1941, alive and well thirteen years after operation (*The British Journal of Surgery*, Volume XXIX, 1941, page 37), another operated on by Mr. Leonard Ley, of Yarmouth (*The British Journal of Surgery*, Volume XXX, 1942, page 168), alive and well at the time of a further report from him (*British Medical Journal*, Volume I, 1944, page 304), and still another reported by Mr. E. W. Thomas, of Burnley (*British Medical Journal*, Volume I, 1944, page 435). This patient lived for six months and succumbed to an attack of acute gastro-enteritis.

Mr. Thomas noted, as I had done, that the liver was better reduced after the bowel had first been replaced. He writes: "I found that reduction of the liver was simplified by reducing the intestine first."

My patient is now living in New Zealand, and I was pleased to receive a letter only last month from Mr. H. K. Corkill, of Wellington, who had recently and most successfully approximated her widely separated recti and contemplates later operating on the double inguinal herniæ. He made an interesting observation that "no gut was visible under the peritoneum of the mid-abdominal zone, the whole of that area being occupied by the liver, as was to be expected from the description of your original operation".

The point about the liver is, I think, important. It is apparently necessary to enlarge the opening in the abdominal wall before it can be replaced (Ley, Wien-Smith, Rogers). *Contrary to what one might perhaps expect from the story* of development, it is comparatively easily reduced after the intestines have been replaced, but it may not be possible to return it in the reverse order (Thomas, Rogers). In Mr. Ley's case the liver was adherent to the upper part of the sac, and Mr. Wien-Smith's case is particularly interesting in this connexion inasmuch as his was one of those very rare cases in which the liver alone is outside the abdomen.

Finally the advisability of early operation is apparent. In my case this was carried out within half an hour of division of the umbilical cord, and within a few hours of birth in each of the other cases which I have mentioned.

Yours, etc.,

Cardiff, LAMBERT ROGERS.
September 5, 1947.

TREATMENT OF VARICOSE VEINS BY HIGH LIGATION, SECTION AND INJECTION: AN INVESTIGATION.

SIR: Permit me to report a small number of Trendelenburg's operation for varicose veins, which may be of interest in connexion with the discussion after Dr. Moulden's paper, "Treatment of Varicose Veins by High Ligation, Section and Injection: An Investigation", published in your journal on August 23, 1947.

After reading a letter by Alan Shorter in the *British Medical Journal*, January 5, 1946, wherein he recommended passing a ureteric catheter inside the vein as far down as possible and injecting four cubic centimetres of 4% sodium morrhuate, we used a similar method injecting two cubic centimetres of "Ethamolin".

In seven cases the catheter travelled to the region of the medial malleolus; in five cases it did not pass beyond the knee joint.

Previously there had been some difficulty in stopping any flux of the "Ethamolin" through the cut end of the long saphenous vein, and also, in determining how far down the vein the injected solution reached.

The results have been uniformly satisfactory to date; one feels more confident also when depositing the sclerosing solution well down the vein.

Yours, etc.,

Balaklava, E. A. JOSKE.
South Australia,
September 2, 1947.

DEVELOPMENT IN OBSTETRICS AND GYNÆCOLOGY.

SIR: In the last issue of your journal (September 6, 1947) my interest was aroused at once by the title of an address by Sir William Fletcher Shaw, and I read eagerly in search of new truth about the "Development of Obstetrics and Gynæcology". Imagine my disappointment to find that only the first half of the address dwelt upon subject matter suggested by the title, while the remainder was devoted to a dissertation on medical education and the varied domestic relations which have existed from time to time between three Royal Colleges. The medical pedagogues of this country may have something to say about the latter half of the address, but my troubles are found in the preliminary historical section, and I feel impelled to mention them here in the hope that some kind person may think it worth while to set my mind at rest.

One cannot quibble at the statement that Soranus of Ephesus described podalic version in his book, as it is generally conceded that he was the originator of this procedure, but it is strange to find the obstetrical chair mentioned in the same context. Surely the use of this contrivance goes back to early Egyptian times, and is referred to in the first chapter of Exodus—"when ye do the office of a midwife to the Hebrew women and see them upon the stools".

Dr. Charles White, of Manchester, was undoubtedly an outstanding practitioner of the late eighteenth century, but it is questionable whether he should be hailed in all seriousness as "the father of aseptic midwifery". In common with a few other advanced thinkers of his day, he was well informed in matters of public health, since Stephen Hales and Sir John Pringle had stressed the necessity for better ventilation, cleanliness and personal hygiene in army barracks, jails and hospitals. But the idea behind it all was still the "miasmata" in the surrounding atmosphere, rather than the possibility of a "private pestilence" of human origin. However, medical history does give full credit to Charles White for his efforts to introduce ventilation and cleanliness into hospitals and to segregate infected patients in obstetric practice. But, once again, poor Semmelweiss has been sadly neglected, and his name is not even mentioned in this paper.

Finally, I am completely mystified by the author's statements about the revival of ovariotomy and his canonization of Dr. Charles Clay, of Manchester, as a great figure in the history of gynæcological surgery. He writes: "By 1880 he [Clay] had performed the operation four hundred times, and it was then that Spencer Wells, who later became famous as an ovariotomist, came to watch him operate, and later began his own successful career. . . ." I have been led to believe that the establishment of the operation of ovariotomy upon a sound and permanent basis began with the work of Spencer Wells in 1858. On the other hand, the Clay tradition is always associated with that dark period when the mortality rate was 50%, even in the most competent hands, and distinguished surgeons gave it as their considered opinion that the operation was dangerous, unwarranted and inimical to the best interests of the patient and the medical profession. In actual fact, Spencer Wells told the profession exactly how the mortality could be considerably reduced; and this paper was published in 1858. In the following twenty years he had performed the operation 800 times with a mortality of about 25%, the marked improvement being attributed to his manual dexterity and scrupulous cleanliness in operative technique. He published his famous book in 1872. In 1864 Dr. Thomas Keith, of Edinburgh, obtained better results than any living surgeon, and in 1870 had reduced the mortality to 16% with the antiseptic methods suggested by Professor Joseph Lister. Later he had an unbroken series of eighty successful cases. This may have something to do with the consistent exclusion of the name of Charles Clay from most textbooks on the history of medicine.

Yours, etc.,

Parramatta, K. MACARTHUR BROWN.
New South Wales,
September 11, 1947.

"FIXED" ERUPTIONS CAUSED BY SULPHADIAZINE.

SIR: In regard to the subject of "fixed" eruptions caused by sulphadiazine treatment in an abstract in the issue of September 13, 1947, a personal experience may be of some interest and serve also, perhaps, as a warning to those who may read. Having suffered at an interval of years from pulmonary infections (lobar pneumonia and pneumonitis), both of which had commenced as an ordinary common "cold", I began to take some care when suffering from the latter. A colleague suggested aborting the coryzal attacks with "sulpha" drugs—such a procedure being at that time discussed in the journals. For a time I experimented with sulphathiazole with only moderate success, but at least without positive harm.

Then sulphadiazine became available and I changed to that drug. On the first occasion I had what I regarded as reasonable success, though I am quite willing to admit that the result may have been purely subjective. Some six months later I used the drug again. Twenty-four hours after commencing the therapy intense itching developed on the palmar surface of one hand, dorsal surfaces of both thumbs and the dorsal surface of one toe. At each of these situations there developed a single large weal, bright red in colour and extremely itchy; the area was about half a square inch. The lesions were obviously urticarial in appearance. At the time I had been staying for the first occasion in my life for some weeks in an Indonesian town and the attack was ascribed to sensitivity developed to some local food allergen.

Nine months later I had to make a long train journey while suffering from a "cold" and resorted again to

sulphadiazine. Within a few hours the itching commenced in exactly the same situations as previously and overnight similar lesions had developed. In addition, however, there were very tender areas at the anal orifice and to one side of the hard palate. As far as I could ascertain by minor inspection these two areas were red and denuded, but were not ulcerated. Needless to say self-medication was hastily suspended, and after some discomfort for forty-eight hours the cure was complete. I have no wish for further experimentation along these lines.

The following points have some bearing on the subject:

1. Full therapeutic doses were always used (2·0 grammes *statim*, 1·0 gramme fourth hourly).
2. The only other drugs taken in company with sulphadiazine were simple standard alkaline mixtures to prevent, if possible, renal complications.
3. I have never suffered from any other allergic manifestations, though I do suffer from migraine.
4. At no period were any urinary symptoms experienced.

For obvious reasons I wish to remain anonymous.

Yours, etc.,

Undated. "EXPERIENTIA DOCET".

A DISCLAIMER.

SIR: Recently you published a letter from me disclaiming a statement which I was wrongly stated to have made. I would be glad if you would publish this further letter which I have recently received.

Yours, etc.,

14, Parliament Place, Melbourne, C.2, September 11, 1947. VICTOR HURLEY.

Mr. Victor Hurley,
14 Parliament Place,
Melbourne, C.1.

Dear Sir,

I wish to acknowledge the receipt of your letter denying a statement supposed to have been made by you in a circular letter issued under my signature. I accept the denial and apologize for the mistake.

Further investigation has shown that the statement was made by another prominent member of the medical profession.

Hoping you have not been inconvenienced.

Yours sincerely,

R. CURLEWIS,
Secretary, Medical Committee,
Australian Communist Party,
49 Elizabeth Street, Melbourne.

September 8, 1947.

Post-Graduate Work.

TASMANIAN POST-GRADUATE COMMITTEE IN MEDICINE.

A POST-GRADUATE COMMITTEE IN MEDICINE has been formed in Tasmania. Organizations undertaking post-graduate education in Tasmania were asked to send representatives, and the following have accepted office in the Tasmanian Post-Graduate Committee: *President*, Dr. John Grove (Royal Australasian College of Physicians); *Secretary*, Dr. W. W. Wilson, 173, Macquarie Street, Hobart (Royal College of Obstetricians and Gynæcologists); *Members of Committee*, Dr. F. W. Fay (Southern Division, Tasmanian Branch of the British Medical Association), Dr. C. Craig (Northern Division, Tasmanian Branch of the British Medical Association), Dr. J. Bruce Hamilton (Ophthalmological Society of Australia, British Medical Association).

The first activity of the committee is to arrange for lectures to be given in Hobart and Launceston by Dr. Chandler Brooks, Associate Professor of Physiology, Johns Hopkins Hospital, Baltimore. Dr. Brooks will give two lectures in Launceston on September 29 and 30, 1947, at 8.15 o'clock p.m. at the rooms of the Royal Society of Tasmania on "The Control of Body Water Balance" and "The Control of Reproductive Function" respectively. He will give two lectures at Hobart at the Tasmanian Museum on October 3 and 4, 1947, at 8.15 o'clock p.m., on "Obesity and Appetite". The fee for attendance at the whole course or part thereof will be one guinea. Those wishing to attend are asked to communicate with the secretary without delay.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 173, of September 11, 1947.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

Squadron Leader L. R. Trudinger (257718) is granted the acting rank of Wing Commander, 3rd April, 1947, whilst occupying a Wing Commander post.

The appointment of Flight Lieutenant K. G. Howsam (257504) is terminated on demobilization, 30th May, 1947.

The appointment of Temporary Group Captain A. H. Baldwin (264907) is terminated, 5th December, 1945.

Alec Hutcheson Baldwin (264907) is appointed to a commission with the temporary rank of Group Captain for part-time duties, 6th December, 1945.

Reserve: Medical Branch.

The following ex-officers are appointed to commissions with temporary ranks as shown: Squadron Leader Frederick Thomas Humphery (261369), 1st June, 1947, Flight Lieutenants Colin Ray Ratcliff (267517), 17th April, 1947, Kenneth George Howsam (257504), 31st May, 1947, Richard Geoffrey Bligh (263611), 1st June, 1947.

The following ex-officers are appointed to commissions with the temporary rank of Squadron Leader: Thomas Francis Ahern (263339), 15th July, 1947, Max Anthony O'Halloran (262870), 1st August, 1947.

Medical Prizes.

THE STAWELL PRIZE.

THE Stawell Prize, a memorial to the late Sir Richard Stawell, is open for competition. The amount of the prize is £30.

The conditions are as follows.

1. The prize shall be awarded to the writer of the essay adjudged to be the best on a subject selected annually.
2. The subject for 1947 is: "The Diagnosis and Treatment of the Anæmias."
3. The dissertation should be based on personal observation and experience of the writer.
4. The competition is open to graduates of any Australian university.
5. The trustees reserve the right to withhold the award.
6. Essays must be delivered to the Medical Secretary, British Medical Association (Victorian Branch), by 4 p.m. on December 31, 1947.
7. Each essay must be typewritten or printed and must not exceed 75,000 words in length.
8. Each essay must be distinguished by a motto and must be accompanied by a sealed envelope marked by the same motto, containing the name and address of the author.
9. The trustees reserve the right to publish the prize essay.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Hyem, Hilary Fay, M.B., B.S., 1947 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Dunn, David Brian, M.B., B.S., 1945 (Univ. Sydney), c.o. Mr. A. Booth, 771, Anzac Parade, Maroubra Junction.

Indyk, Jack Solomon, M.B., B.S., 1945 (Univ. Sydney), 21, Birriga Road, Bellevue Hill.

Nathan, David Bertram, M.B., B.S., 1945 (Univ. Melbourne), Royal Hobart Hospital, Hobart.

Carne, Jeannette Constance, M.B., B.S., 1947 (Univ. Sydney), Sydney Hospital, Macquarie Street, Sydney.

Cronin, Kevin James, M.B., B.S., 1947 (Univ. Sydney), 3, Malvern Avenue, Chatswood.

Schofield, James Alexander Vindin, M.B., B.S., 1947 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Obituary.

CYRIL BERESFORD HOWSE.

WE regret to announce the death of Dr. Cyril Beresford Howse, which occurred on September 19, 1947, at Orange, New South Wales.

Notice.

INTERNATIONAL CONFERENCE ON PSYCHIATRY.

THE Commonwealth Department of Health, Canberra, has received advice from the French Legation that the Provisional Committee organizing the International Conference on Psychiatry would welcome representatives from Australian psychiatric associations and other interested persons to the International Conference to be held in Paris in 1949, during the week following the International Conference on Neurology. Anyone interested in this International Conference on Psychiatry is asked to communicate with Dr. A. J. Metcalfe, Acting Director-General of Health, Commonwealth Department of Health, Canberra.

AN APPEAL.

THE Editor of THE MEDICAL JOURNAL OF AUSTRALIA is anxious to complete his file of *The Quarterly Journal of Medicine*. The issue for January, 1943 (Volume 12), is missing. The Editor would be glad to hear from any reader who is able to supply the missing number.

Medical Appointments.

Dr. J. Zimmet has been appointed officer of health for Iron Knob and district, South Australia.

Dr. Margurite M. Barlow, Dr. L. Barrett-Lennard, Dr. R. A. Barter, Dr. I. M. H. Camens, Dr. D. B. Cheek, Dr. Rosemary J. Close, Dr. T. B. Cullity, Dr. G. T. Ey, Dr. B. R. Goode, Dr. A. K. Grant, Dr. R. Hecker, Dr. G. H. Jones, Dr. J. K. Kneebone, Dr. G. L. Mellor, Dr. P. E. Mellows, Dr. R. L. Miller, Dr. G. W. Milton, Dr. J. A. O'Brien, Dr. T. A. Paull, Dr. W. R. Randell, Dr. R. T. W. Reid, Dr. Janet B. Russell, Dr. T. R. Thomson, Dr. I. S. Wallman, Dr. N. S. P. Wicks and Dr. C. G. Wilson have been appointed resident medical officers to the Royal Adelaide Hospital, Adelaide.

Dr. D. R. R. Anderson, Dr. E. S. Bean, Dr. J. B. Bennett, Dr. B. L. Cornish, Dr. A. W. Derrington, Dr. H. M. Douglas, Dr. M. W. Guymer, Dr. D. N. Kirkman, Dr. D. B. McLeay, Dr. W. J. Sleeman, Dr. T. B. Gordon and Dr. R. S. Wurm have been appointed associate medical officers to the Royal Adelaide Hospital, Adelaide.

Books Received.

"Advances in Internal Medicine", by various authors; Volume II; 1947. New York: Interscience Publishers, Incorporated. London: Interscience Publishers, Limited 9" x 6", pp. 652, with many illustrations. Price: $9.50

"Vital Statistics and Public Health Work in the Tropics, including Supplement on the Genealogy of Vital Statistics", by P. Granville Edge, O.B.E., D.Sc., with a foreword by Major Greenwood, D.Sc., F.R.C.P., F.R.S.; 1947. London: Baillière, Tindall and Cox. 8½" x 5½", pp. 276. Price: 15s.

"Handbook of Diagnosis and Treatment of Veneral Diseases", by A. E. W. McLachlan, M.B., Ch.B. (Edinburgh), D.P.H., F.R.S. (Edinburgh); Third Edition; 1947. Edinburgh: E. and S. Livingstone, Limited. 7¼" x 4¾", pp. 284, with many illustrations, some of them coloured. Price: 15s.

"An Introduction to Dermatology", by G. H. Percival, formerly by Norman Walker, Kt., M.D., LL.D., F.R.C.P., and G. H. Percival, M.D., Ph.D., F.R.C.P.E., D.P.H.; Eleventh Edition; 1947. Edinburgh: E. and S. Livingstone, Limited. 8½" x 5½", pp. 358, with many illustrations, mostly coloured. Price: 35s.

"Atlas of Bacteriology", by R. Cranston Low, M.D., F.R.C.P.E., F.R.S.E., and T. C. Dodds, F.I.M.L.T., F.I.B.P., F.R.P.S.; 1947. Edinburgh: E. and S. Livingstone, Limited. 9½" x 6", pp. 178, with many coloured illustrations. Price: 32s. 6d.

Diary for the Month.

OCT. 1.—Western Australian Branch, B.M.A.: Council Meeting.
OCT. 1.—Victorian Branch, B.M.A.: Branch Meeting.
OCT. 2.—South Australian Branch, B.M.A.: Council Meeting.
OCT. 3.—Queensland Branch, B.M.A.: Branch Meeting.
OCT. 3.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates.
OCT. 7.—New South Wales Branch, B.M.A.: Council Quarterly.
OCT. 10.—Queensland Branch, B.M.A.: Council Meeting.
OCT. 13.—Victorian Branch, B.M.A.: Finance Meeting.
OCT. 14.—Tasmanian Branch, B.M.A.: Ordinary Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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